Israel currently has access to Patriot and Arrow missile defense technologies, great systems which are critical for defending against longer-range missiles, but poorly suited to defend Israeli territory from the types of rockets and missiles currently being fired by Hezbollah.

It is for this reason that I support the U.S. Missile Defense Agency efforts—in cooperation with the Israeli Missile Defense Organization—to develop a system for short-range missile defense. Aimed at projectiles with a range of less than 200 kilometers, this system would provide Israel with another way to defend itself, rather than having to rely exclusively on offensive action. It is propitious that the Defense Appropriations Committee is marking up its bill this week. For more than a year, I have worked with Senators Stevens and INOUYE to support the short-range missile defense program. Under their leadership, I believe that the committee will provide the investment necessary to accelerate fielding of the system. Unfortunately, the need for a redoubled effort is now clearer than ever.

We still do not know how the current crisis is going to end. What we can and should say, however, is that Israel has the full support of this body in its ongoing efforts to fight terrorists, protect its citizens, and create the circumstances for peaceful coexistence with Lebanon, and all of its neighbors.

# ORDER FOR STAR PRINT—H.R. 5672

Mr. KYL. Mr. President, I ask unanimous consent that H.R. 5672 be star printed.

The ACTING PRESIDING pro tempore. Without objection, it is so ordered.

Mr. KYL. Mr. President, I suggest the absence of a quorum.

The ACTING PRESIDING pro tempore. The clerk will call the roll.

The assistant legislative clerk proceeded to call the roll.

Mr. SPECTER. Mr. President, I ask unanimous consent that the order for the quorum call be dispensed with.

The ACTING PRESIDENT pro tempore. Without objection, it is so ordered.

#### CONCLUSION OF MORNING BUSINESS

The ACTING PRESIDENT pro tempore. Morning business is closed.

FETUS FARMING PROHIBITION ACT OF 2006

ALTERNATIVE PLURIPOTENT STEM CELL THERAPIES ENHANCEMENT ACT

# STEM CELL RESEARCH ENHANCEMENT ACT OF 2005

The ACTING PRESIDENT pro tempore. Under the previous order, the

hour of 12:30 having arrived, the Senate will proceed to the consideration of S. 3504, S. 2754, and H.R. 810, en bloc, which the clerk will report.

The legislative clerk read as follows: A bill (H.R. 810) to amend the Public Health Service Act to provide for human embryonic stem cell research.

A bill (S. 3504) to amend the Public Health Service Act to prohibit the solicitation or acceptance of tissue from fetuses gestated for research purposes, and for other purposes.

A bill (S. 2754) to derive human pluripotent stem cell lines using techniques that do not knowingly harm embryos.

Mr. SPECTER. Mr. President, I ask unanimous consent that I may use this hourglass during the course of the debate.

The ACTING PRESIDENT pro tempore. Without objection, it is so ordered.

Mr. SPECTER. Mr. President, it is difficult to characterize the importance of the debate which the Senate is now beginning because the most fundamental aspect of human life is our health. Without our health, there is nothing we can do. Medical research has performed wonders, and stem cells, which came upon the scene in November of 1998, have the most remarkable potential of any scientific discovery ever made with respect to human health. These stem cells have the capacity to regenerate disease cells in the human body and have the capacity to cure maladies of all sorts, including cancer, heart disease, Parkinson's, Alzheimer's, spinal cord—the long litany of maladies which confront mankind.

The stem cell debate began with the hearings conducted by the Appropriations Subcommittee on Labor, Health and Human Services, which I chair and on which Senator Tom Harkin is ranking member. We began those hearings within days of the November 1998 announcement and have had some 18 hearings on stem cells to explore all ramifications of the potential of stem cells.

There is now an avalanche of evidence that the use of stem cells in scientific research has boundless potential. The state of the law is that federal funding may only be used for a limited number of obsolete stem cell lines.

The bill which is the fundamental issue before the Senate today is H.R. 810, which Senator HARKIN and I introduced as a Senate bill with some 42 cosponsors, which would allow research on embryonic stem cells.

There are two other bills at issue. One is S. 2754 which Senator SANTORUM and I have introduced which relates to long-range research not involving the embryos, but it is totally separate and distinct from H.R. 810 in that it does not have the potential that the embryonic stem cells have and it is long range.

The third bill is S. 3504 which relates to fetus farming prohibition, and I believe there will be little controversy about this bill. The bill would deal with two unethical activities—the so-

licitation or acceptance of human fetal tissue knowing that a pregnancy was deliberately initiated to provide such tissue and the solicitation or acceptance of tissues or cells from a human embryo or fetus that was gestated in the uterus of a nonhuman animal. I believe there will be no contest about that.

I expect relatively little contest about S. 2754, which does not in any way relate to the importance of research on embryonic stem cells.

The embryonic stem cells are used from many embryos which have been created for in vitro fertilization. Customarily, a dozen or so are created, maybe three or four are used, and the others are then frozen and ultimately will be discarded. There are some 400,000 of those embryos which are frozen today, and the likelihood of their being used is nil.

Senator Harkin and I introduced legislation to provide for Federal funding to encourage adoption of these embryos. If they could be used to create human life, I would not in the remotest way contend that they ought to be used for scientific research. But the fact is that they will either be used for scientific research or thrown away.

When the issue of adoption was raised, as I say, we took the lead in the Labor, Health and Human Services, and Education Subcommittee in the year 2002 and appropriated \$1 million and since then have appropriated more in succeeding years.

As of May 31, 2006, the Snow Flake Organization, one of the Department of Health and Human Services' embryonic adoption grantees, had a news conference announcing that there had been 100 births since 1997. As of May 31, 2006, the National Embryo Donation Center had a total of 28 deliveries or ongoing pregnancies. Out of the 400,000, even with Federal funding available to encourage adoption, the number is 128, which makes it conclusive that these 400,000 embryos will either be used for scientific research or thrown away.

The bill which Senator HARKIN and I have introduced is very carefully structured to be sure that it satisfies the strictest ethical scrutiny.

This is the essence of the bill: first, that the stem cells were originally created for fertility treatment purposes; second, are in excess of the clinical need; third, the individual seeking fertility treatments for whom the embryos were created has determined that the embryos will not be implanted in a woman; fourth, they will be otherwise discarded; and fifth, the individual for whom embryos were created has provided written consent for embryo adoption.

This bill does not allow Federal funds to be used for the derogation of stem cell lines, a step in the process where the embryo is destroyed—the lines are created and the embryos are destroyed before they are subjected to research which is funded by the Federal Government under the bill which Senator HARKIN and I are promoting.

The evidence of the utility of these embryonic stem cells is unquestioned, and the need for more stem cell lines similarly is unquestioned.

On August 9, 2001, President Bush made an Executive determination to allow Federal research on some 60 existing stem cell lines. It was later determined that there might be as many as 70 lines. It has since been determined that there are no more than 20 lines, and perhaps even fewer. These existing lines are tainted with mouse feeder cells, which is a technical consideration that they can't be used.

The experts in the field: Dr. Nabel, Director of the National Institutes of Health (NIH) Heart, Lung, and Blood Institute, focused on the unavailability of stem cells for research, noting that only four stem cell lines are currently in common use.

The enormous advantages of stem cells were outlined in some detail by the various Directors of the NIH.

Dr. Zerhouni, Director, NIH, said:

Embryonic stem cell research holds great promise for treating, curing, and improving our understanding of disease, as well as revealing important basic mechanisms involved in cell differentiation and development.

Dr. Fauci, Director of the National Institute of Allergy and Infectious Diseases, said:

NIAID believes that embryonic stem cell research could be advanced by the availability of additional cell lines. Individual stem cell lines have unique properties. Thus, we may be limiting our ability to achieve the full range of potential therapeutic applications of embryonic stem cells by restricting research to the relatively small number of lines currently available.

Dr. Battey, Director of the Deafness Institute, said:

The more stem cell lines available for study the more likely a cell line will be maximally useful for a given research, and potentially clinical, application . . . the scientific community would be best served by having a greater number of human embryonic stem cell lines available for study.

Dr. Nabel, the director of the Heart, Lung, and Blood Institute, said:

... we recognize that the limitations of existing cell lines are hindering scientific progress among a community that is very eager to move forward in this promising area. We support the creation of dissemination of newer stem cell lines in the expectation that it will advance this field and hasten progress in basic and clinical research.

Similar opinions were articulated by Dr. Tabak, director of the Dental Institute; by Dr. Volkow, director of the National Institute of Drug Abuse; by Dr. Collins of the Human Genome Institute; by Dr. Neiderhuber, director of the Cancer Institute; by Dr. Rodgers, acting director of the Diabetes and Digestive Disease Institute; by Dr. Landis, director of the Neurology Institute; by Dr. Berg, director of the General Medical Sciences Institute; by Dr. Alexander, director of the Child Health Institute; by Dr. Sieving, director of the Eye Institute; by Dr. Schwartz, director of the Environmental Health Institute; by Dr. Hodes, director of the Aging Institute; by Dr. Li, director of the Alcohol Abuse Institute; by Dr. Alving, acting director of the Center for Research Resources. All concur with the need for additional stem cell lines for research in dealing with the maladies in their own particular area.

By way of a strictly personal note, I had a little root canal work done this morning. The dentist asked me what was going on in the Senate today. I told him about stem cell research. He said: I hope you win your case because it will help us on root canal work. The embryonic stem cells can be injected into the canal with the diseased tissue, and you can have a third set of teeth.

Wherever I turn, people in the medical research field—and I regret I have had a lot contacts—extol the enormous virtues of stem cells—that they have the capacity to replace diseased cells. If you deal with a heart problem and you have a diseased area, the stem cells can be injected. These embryonic stem cells have remarkable flexibility and capacity to provide a healthy cell to replace the diseased cell.

We have had remarkable articulation of support from Members of the Senate, as well as Members of the U.S. House of Representatives. The House bill was passed with a comfortable margin, with some 50 Republicans crossing party lines. In the Senate, we have many Senators who are most actively known in the pro-life community, and while they would not make a woman's right to choose available, they do actively support stem cell research. It is important to focus on the difference that being against a woman's right to choose has nothing to do with the issue of stem cell research. They are entirely separate.

Authors of the June 4, 2004, letter to the President on stem cell research include some of the strongest pro-life Senators in our body, including Senator Orrin Hatch, Senator Gordon Smith, Senator Lamar Alexander, Senator Thad Cochran, Senator Kay Bailey Hutchison, Senator Trent Lott, Senator John McCain, and Senator John Warner. There is every expectation there will be more Senators from the strong pro-life community who will be supporting embryonic stem cell research.

We have support from two of our colleagues who were very active on the pro-life side, former Senator John Danforth and former Senator Ben Nighthorse Campbell.

On the strictly personal level, I have noted the declaration by President Nixon in 1970 when he declared war on cancer. Had that war been pursued with the same diligence we pursue other wars, I believe cancer would long ago have been cured. Without unduly dwelling on my own situation with Hodgkin's, a year of chemotherapy, I think had the research been fulfilled, I would have been spared that malady.

The maladies such as heart disease, cancer, Parkinson's, and Alzheimer's disease strike approximately 110 mil-

lion Americans a year. We all know people close to us who have been stricken with cancer or heart failure. My own chief of staff, Carey Lackman, a beautiful young woman of 48, was stricken with breast cancer and died 2 years ago. My son's law partner, Paula Klein, a beautiful woman with two young children, age 55, died of breast cancer. A Federal judge, Edward R. Becker, well known to the Senate for his active work for more than 2 years on asbestos legislation, died in May 2006 from prostate cancer which had metastasized. Those are anecdotal, typical of tens of thousands, hundreds of thousands of people who have died or are incapacitated from diseases which could be cured with stem cell research. It is not only the individuals who contract the maladies, it is their families. It is their loved ones.

President Reagan's wife, Mrs. Nancy Reagan, who is a very nonpublic retiring person, has taken a public stand in support of embryonic stem cell research because of the understanding and impact on her life when President Reagan had Alzheimer's and she had to care for and watch her husband suffer from that malady. We have had very extensive indicators, evidence, that stem cell research could delay the onset of Alzheimer's and, perhaps, cure it entirely.

The conflict which we have on this issue between ideology and science is one which mankind has faced repeatedly in the course of our historical experience. A century from now, people will look back at this debate on stem cell research and wonder how we cannot possibly utilize all of the benefits of science to stop people from dying, to stop people from suffering, when we have these embryos which are either going to be thrown away or used. They are not going to create living people. If they were, no one would be suggesting they be used for scientific research.

There are a number of striking examples of rejection of scientific knowledge at various stages in our human history which, in retrospect, are absurd. For example, in 1486, a committee of the Spanish Government concluded that the voyage proposed by Christopher Columbus should not be funded because "the Western Ocean is infinite and perhaps unnavigable . . [and] . . . so many centuries after the Creation, it was unlikely anyone could find hitherto unknown lands of any value."

Fortunately, Queen Isabella, disagreed.

Galileo was imprisoned for his support of Copernicus' theory that the planets revolved around the Sun. This allowed the acceptance of a theory upon which all of modern astronomy and space travel are based and what we know from our own experience in the solar system.

Michael Servetus has research on human anatomy. Pope Boniface VII banned the practice of cadaver dissection in the 1200s. This stopped the practice for over 300 years and greatly slowed the accumulation of education regarding human anatomy. Finally, in the 1500s, Michael Servetus used cadaver dissection to study blood circulation. He was tried and imprisoned by the Catholic Church.

Anesthesia for women in labor was founded by James Simpson in 1848. Reporting his discovery that anesthesia could be used to lessen pain during child birth, the Scottish Calvinist Church objected to the use of anesthesia during labor because "pain of child birth was God's will." The Scottish Calvinist Church stifled anesthesia use by refusing to baptize any children who were born while a person was anesthetized.

Thomas Edison, who brought electricity to us, had a similar experience. The Committee on Lighting by Electricity in the British House of Commons did not believe that electricity was practical, saying:

There is not the slightest chance of [electricity] competing, in any general way, with gas. There are defects about the electric light which, unless essential changes take place, must entirely prevent its application to ordinary lighting purposes.

Fortunately, that view did not prevail. Fortunately, since it is 102 degrees today and we have an air-conditioned Senate Chamber.

Vaccines, in 1772, in response to the new science of vaccination, Rev. Edward Massey declared:

Diseases are sent by Providence for the punishment of sin, and the proposed attempt to prevent them is a diabolical operation.

Had vaccines been outlawed, millions of lives would have been lost.

In the 1820s, Dr. Dionysus Lardner, Professor of Natural Philosophy and Astronomy at University College, London, stated, referring to rail travel:

Rail travel at high speed is not possible because passengers, unable to breathe, would die of asphyxia.

If it were true, I would not be here today. I would have had to find another way than rail travel to come from Philadelphia to arrive in time for this debate.

I go through this list, and it is only an abbreviation of a much longer list to show how attitudes at different times in retrospect look foolish, look absolutely ridiculous.

When we see in our everyday existence the enormous suffering from so many maladies, there is just no sensible, logical reason why we should not make use of stem cell research.

When I joined the Subcommittee on Health and Human Services in 1981, the budget for the National Institutes of Health (NIH) was a little over \$3 billion. With the leadership of that subcommittee, those funds have now been increased to almost \$29 billion annually. We are being outstripped by other countries which are undertaking embryonic stem cell research. They are taking our scientists. We have the capacity with the NIH and the Federal funding to make enormous additional progress on medical research to save

lives, to save pain and suffering. We ought to do so. We ought to pass the Specter-Harkin bill—the Senate's version of the House-passed bill—and seek to persuade the President of the United States that this is a bill which ought to be signed into law.

I know my 30 minutes is up, so I yield to my distinguished colleague from Iowa, Senator Tom HARKIN.

The PRESIDING OFFICER (Mr. Burr). The Senator from Iowa.

Mr. HARKIN. Mr. President, first, I congratulate Senator SPECTER on an exemplary opening statement on this 2-day debate we will be engaged in and also thank him, as I will in my formal statement, for his leadership over the past several years on so many issues of health care, and this one in particular. I am proud to join him in this effort, as I have for the last year, to try to get H.R. 810 to come up.

Mr. President, we have waited a long time for this day to come, I think too long. We could have and should have voted on H.R. 810 more than a year ago after it passed in the House with a strong bipartisan majority. So we have lost some valuable time. But more to the point, America's best medical researchers have lost valuable time. But be that as it may, H.R. 810 has finally come to the Senate floor, and we will vote on it tomorrow afternoon.

I thank majority leader BILL FRIST for brokering the agreement to make this vote possible. It took courage for him to announce last summer that he supports the bill. And it took courage for him to schedule this vote. I have already commended him privately, and I commend him publicly as well.

Again, I thank Senator SPECTER for leading the effort to promote stem cell research for so many years. He chaired the very first hearing in Congress on embryonic stem cells, as he said in his remarks, in December of 1998. And, again, just repeating what Senator SPECTER had said—but for the sake of emphasis—our Labor, Health, and Human Services Appropriations Subcommittee has held 18 hearings on this research since then.

Senator SPECTER and I also introduced the very first bill in Congress on stem cell research in January of 2000. So Senator SPECTER and I have traveled a long road together, and I thank him for being such an extraordinary leader and partner in this effort.

I also thank the other Senate leaders on stem cell research: Senator HATCH, Senator FEINSTEIN, Senator SMITH, and Senator KENNEDY. Counting Senator SPECTER and myself, there are three Republicans and three Democrats on the list who have led the effort to bring up H.R. 810 and pass it, and it has been a truly bipartisan effort all the way.

Most of all, I thank the hundreds of thousands of families and patients who never gave up, who kept up the pressure to bring this bill to the floor, and who are so eager to see H.R. 810 sent to the President's desk for his signature. They have kept the faith. Now it is our job to see they are not disappointed.

Under the UC agreement, we will debate and vote on three bills. But make no mistake, the only one that really matters is H.R. 810, the Stem Cell Research Enhancement Act. This is the one bill that, at long last, will unleash some of the most exciting and promising research of modern times.

So, as we begin this debate, it is a good time to step back and ask: Why is there so much support for H.R. 810? Hundreds of patient advocacy groups have endorsed the bill; so have dozens of Nobel Prize winning scientists, dozens of research universities, and, I might add, so has the American public. Polls now show that 72 percent of Americans support embryonic stem cell research—72 percent—compared with 24 percent who oppose it. That is a 3-to-1 margin. So the American people—three out of four—are in favor of embryonic stem cell research.

Why? Well, the answer is very simple. Embryonic stem cell research offers real hope-real hope-for people with Lou Gehrig's disease, real hope for people with Parkinson's, real hope for people with spinal cord injuries, real hope for people with heart disease, real hope for people with diabetes, real hope for people with cancer, real hope for people who suffer from autoimmune diseases such as lupus. All told, more than 100 million Americans have diseases that one day could be treated or cured with embryonic stem cell research. Here is just a brief list of them: cardiovascular disease, autoimmune disease, Alzheimer's, Parkinson's, spinal cord injuries, birth defects, severe burns-millions of Americans who could be cured or helped with stem cell research.

But it is not just Members of Congress who are saying it; we have asked top scientists. Senator Specter and I sent letters to the National Institutes of Health last week. Senator Specter referred to that in his remarks. We asked their top scientists for their thoughts on stem cell research. Every single one of them said embryonic stem cell research offers enormous potential. We asked 19 NIH scientists—heads of the different individual institutes—and all 19 agreed.

Here is what Dr. Zerhouni, the NIH director, wrote to us:

Embryonic stem cell research holds great promise for treating, curing, and improving our understanding of disease.

This is from Dr. Elizabeth Nabel, the director of the Heart, Lung, and Blood Institute. She wrote:

Embryonic stem cell research has vast potential for addressing critical health [care] needs.

And it is not just NIH scientists who believe this way. In a letter from Dr. J. Michael Bishop, who won the Nobel Prize in medicine in 1989, he writes:

The vast majority of the biomedical research community believes that human embryonic stem cells are likely to be the source of key discoveries related to many debilitating diseases.

I could go on and on, but I think you get the picture. Scientists agree: embryonic stem cell research offers enormous hope—real hope—for easing human suffering.

Now, some may ask: I thought the Federal Government already supports embryonic stem cell research. What about the speech the President gave 5 years ago?

Well, let me try to explain the President's policy as was enunciated 5 years ago. He gave the speech on August 9, 2001. I remember it well. I was listening to it. I was on the road. I was listening to it on the radio.

The President, at that time, said that federally funded scientists could conduct research on embryonic stem cells only if the stem cells had been derived prior to 9 p.m., August 9, 2001. Well, I thought to myself at the time—and I have thought since—that is rather odd. It is morally OK to do research on stem cells derived before 9 p.m., but it is not morally acceptable to do research on stem cells derived after 9 p.m.? Well, I thought to myself, why not 9:05? What about 9:15 p.m. or 9:30 or midnight? Why was 9 p.m. the magic cutoff hour on August 9, 2001?

Well, clearly it was totally arbitrary. That just happened to be when the President gave his speech. But for whatever reason, the President said only those lines derived by 9 p.m. August 9, 2001, were eligible for federally funded research.

At the time, after I checked into it, some of us were hopeful that the policy would work. But it has not, and here is why. When President Bush announced his policy, he said 78 stem cell lines were available. Many people thought 78 stem cell lines might be enough, might have enough genetic diversity to actually do the kind of research we needed. But as the years progressed, we found that only 21—only 21—of the approved lines are actually available for study; not 78, only 21.

We found out something else I did not know at the time. All 21 of these lines are contaminated by mouse cells. In other words, the embryonic stem cells were grown on mouse cells, so they are contaminated, making it highly unlikely ever to be used for any kind of human therapy. I ask: Would any of you want to have stem cells used for your illness if they were contaminated with mouse cells? I do not think so, and neither do the scientists. And the other thing we found out is that now many of the 21 lines are too unhealthy to use. They have actually become sick.

Dr. Nabel of the NIH Heart, Lung, and Blood Institute wrote to me that only four of these lines are in common use—four. Dr. Jeremy Berg, another NIH director, director of the general medical sciences, said there are about six lines in common use.

So what is happening now is that these policy restrictions are making our scientists work with one arm tied behind their back. It is having a chilling impact on scientists thinking about entering the field.

Dr. Nora Volkow, director of the NIH Drug Abuse Institute, said it is stifling interest in research. She said:

Despite general interest and enthusiasm in the scientific community for embryonic stem cell research, the limited number of available lines has translated into a general lack of research proposals.

Well, if you are a research scientist at one of our hundreds of universities around the country, and you are eligible for NIH funding, would you want to do research on only four lines that may not lead to anything? Would you put in a proposal to do that? You could be one of our budding genius researchers. You might want to put your efforts and endeavors into something else rather than a dead-end policy.

So I submit that the President's policy is not a way forward, it is a deadend street. It offers only false hope—false hope; not real hope, false hope—to the millions of people across America and the world who are suffering from diseases that could be cured or treated through embryonic stem cell research.

Meanwhile, hundreds of new stem cell lines have been derived since the President's arbitrary deadline of August 9, 2001. These lines are uncontaminated. They are healthy. But they are totally off limits to federally funded scientists. I do not mean just scientists who work at NIH; I am talking about all the scientists who work in all of our universities and research institutions across America. They are off limits—off limits. They cannot use it. It is really a shame.

I was listening to Senator SPECTER earlier talk about some of the earlier pronouncements, some by the Catholic Church, back in the Middle Ages, some by—he mentioned another Calvinist Church—I don't know who all he mentioned—but the views at that time and how we look back and say: How could they have been so blind to prohibit certain activities, such as using cadavers for scientific experimentation to learn how the body works so we could perhaps cure illnesses and diseases?

I was listening to that, and I thought: We have new stem cell lines, uncontaminated with mouse feeder cells, healthy, ready to go. Scientists cannot use them. And I thought: We do not require astronomers today to explore the skies with 19th century telescopes. We do not tell our geologists to study the Earth with a tape measure. If we are serious about realizing the promise of stem cell research, our scientists need access to the best stem cell lines available.

And, again, I would not want anyone to take just my word for it. I think Dr. James Battey knows more about stem cell research than anyone at the National Institutes of Health. He runs the stem cell task force there, and this is what he wrote when I asked him whether it would help our scientists to have access to more stem cell lines. Here is his direct quote:

The more cell lines available for study, the more likely a cell line will be maximally useful for a given research, and potentially clinical, application. For this reason, the scientific community would be best served by having a greater number of human embryonic stem cell lines available for study.

That is from a letter to me from Dr. James Battey, chair of the NIH Stem Cell Task Force, dated July 13, 2006.

Dr. Volkow of the Drug Abuse Institute was even more blunt. She wrote:

Access to a wider array of embryonic stem cell lines would definitely increase scientific opportunity and the chances of breakthrough discoveries.

I should note that scientists in many other countries around the world do not face these kinds of arbitrary restrictions. When you talk to researchers in England, for example, our policy makes no sense to them. They cannot understand why stem cell lines derived on one date are fine to use, but if they are derived on another date they are off limits. They do not have arbitrary barriers like that in England, and that is a big reason so many of the major advances in stem cell research are happening there rather than in the United States.

So we need a stem cell policy in this country that offers real, meaningful hope to patients and their loved ones. That is what H.R. 810 would provide.

Under this bill, federally funded researchers could study any stem cell line regardless of the date it was derived as long as strict ethical guidelines are met. I think it is important to run through some of those ethical guidelines.

First, the only way a stem cell line could be eligible for federally funded research is if it were derived from an embryo that was otherwise going to be discarded. As Senator Specter pointed out, there are more than 400,000 embryos in the United States left over from fertility treatments that are currently sitting frozen in storage. The moms and dads have had all the children they want; they no longer need any more of these embryos, and most of them will be discarded. It happens every single day at fertility clinics around the country. People have used in vitro fertilization, had their children, and they don't want any more. Rather than continue to pay the facility to store them and freeze them, they call up and say we don't want them anymore. The facility discards them. It happens every day.

All we are saying is, instead of discarding them as leftover embryos, let's allow couples, if they wish, to donate them to create stem cell lines that can cure diseases and save lives. The choice is this: Throw them away or use them to ease suffering and, hopefully, cure diseases

It is the second choice that I believe is truly moral and truly respectful of human life. Again, I have to emphasize, as I will today and tomorrow time and time again, H.R. 810 does not create any new embryos. Not one new embryo will be created under H.R. 810—only

those left over in in vitro fertilization clinics, and only if the moms and dads give their written consent.

As I said, the second ethical requirement requires them to provide informed written consent. Again, a lot of people don't realize this, but the President's policy is a little fuzzy on the matter of informed and written consent. Some of the 21 federally approved lines—especially those coming from other countries-don't meet that requirement. So we need to pass H.R. 810 to tighten the ethical guidelines on stem cell research, so there is no question that the embryos were donated voluntarily.

Finally, H.R. 810 prohibits anyone from being paid to donate embryos. There is no chance under this bill that women could be exploited to go through the donation process against their will. So no money can change hands. The three ethical guidelines, to repeat, are: One, we can only use excess embryos in in vitro fertilization clinics; second, there must be informed written consent for the donation of those embryos; and third, no money can exchange hands to pay for any of these.

Let me address one more issue, and that is the matter of the so-called alternative ways of deriving stem cells. Some opponents of this will speak today and tomorrow and argue that we don't need to pass H.R. 810. Instead, they say, we should put our current stem cell research on hold in hopes that some new way of deriving stem cells will pan out some time, hopefully, in the future.

That would be a tragic mistake. I support any ethical means to improve the lives of human beings who are suffering. In fact, Senator Specter and I included language in our appropriations bill last year urging NIH to support research on alternative ways of deriving stem cells. But not one of these so-called alternative methods has ever succeeded in producing a stem cell line. Right now, they are just theories. Maybe one day, 5 years or 7 years or 10 years or 15 years from now, one of these methods will pan out. But maybe

I think this chart tells the story. The NIH estimates that there are about 400 stem cell lines worldwide, almost all of which were derived after the President's arbitrary cutoff date of August 9, 2001. Every one of these lines was derived the same way, using embryos that were left over from infertility treatments that would otherwise have been discarded. So you see on the chart "stem cell lines derived using current method," and we have about 400 stem cell lines worldwide. Now, how many lines were derived using unproven alternative methods? Zero. It is 400 to zero.

Yet we will hear today and, I think, tomorrow from some who say we should pass other bills. We should not use the proven method we have, but we should go to alternative methodolo-

gies. We know right now that zero stem cell lines have been derived from using those alternative methodologies.

Again, should we pursue these alternative methods? Of course. This is no prohibition against that. We should open every door we can in the ethical pursuit to cures. But meanwhile, people we love are dying from Parkinson's and ALS, and children are suffering from juvenile diabetes. Should we say wait another 5, 7, or 10 years and see if we can derive stem cells from these alternative methods? Maybe we can, maybe we cannot. If we cannot, what do we do then? Say the doors are all closed? Meanwhile, we have many stem cell lines derived from leftover embryos in in vitro fertilization clinics.

Another point about the alternatives bill. Even if Congress were to pass it and the President signs it, it has absolutely no impact on the progress of stem cell research. That is because the other bills we are voting on here don't authorize anything NIH cannot do already. We had a hearing. Senator SANTORUM, the author of that bill, was at the hearing. We had people from NIH. Senator DURBIN was there and he asked the question:

Can you tell me whether S. 2754which is another one of the companion bills we will be voting on tomorrow authorizes research on stem cells at the NIH that currently is not permissible or legal?

Dr. James F. Battey at NIH said: No. it does not.

That was on June 27 of this year. So the alternatives bill, S. 2754, might not do any harm, but it doesn't do any good either. It just says, NIH, you can do what you can already do. Well, that is fine with me; I have no problem with that. But don't be fooled into thinking that S. 2754 somehow takes the place of H.R. 810. It doesn't.

That is one more reason we need to focus on H.R. 810.

In closing, my nephew Kelly is one of the millions of Americans whose hopes depend on stem cell research. He has been a quadriplegic for about 27 years since suffering a spinal cord injury in a terrible accident while he was in the U.S. Navy and serving on an aircraft carrier. Kelly's hope has been that sometime scientists will finally find a way to mend his spinal cord so he can walk again. He has been following very closely the whole issue of embryonic stem cell research. His hope, like the hope of Christopher Reeve's, was-we all remember him, our first "Superman"; he fought so hard for embryonic stem cell research before he passed away. They both hoped embryonic stem cell research would lead to a breakthrough that would allow them to walk again. Kelly asks all the time: When is the Senate going to vote on H.R. 810?

You know, we have seen the videos of mice whose spinal cords have been damaged so they could not walk and were treated with stem cells from other mice and they are now walking

again. As Christopher Reeve once said after reviewing the video of one of these white rats that could not walk but was given stem cells and now was walking, "Oh, to be a rat."

Well, after more than a year of prayers and pressure, my nephew Kelly and millions of other Americans suffering from disease and paralysis will get their wish. I am optimistic that we have the 60 votes necessary to pass H.R. 810 tomorrow and send it immediately to the President's desk. There are a lot of stories. I am sure we all have family stories such as my nephew's.

Here is a letter from the ALS Association—the Amyotrophic Lateral Sclerosis Association, also called Lou Gehrig's Disease. It says, in part:

The advancement of stem cell research is vital for people such as Roger Gould from Ames, IA. ALS has steadily eroded Roger's ability to control muscle movement, limiting his ability to speak, walk, move his arms, and lead the type of life most all of us take for granted. Ultimately, the disease will take his life. Stem cell research provides promise to people such as Roger and his wife Cindy that one day an effective treatment for ALS will be found. It also gives hope to thousands of others that ALS no longer will mean death in an average of 2 to 5 years after diagnosis: that one day we may be able to prevent ALS from taking the lives of people such as Rob Borsellino, a nationally recognized columnist from Des Moines, IA, who lost his battle against ALS last month, a year after his diagnosis.

I ask unanimous consent that this letter be printed in the RECORD following my statement

The PRESIDING OFFICER. Without objection, it is so ordered.

(See exhibit 1.)

Mr. HARKIN. Mr. President, my time is up. Again, this is going to be a good debate, a good airing of the issues. Tomorrow we will vote on this bill and send it to the President. I am hopeful that the President, after reviewing it and looking at what happened in the past—the new things that have come to light because of the mouse feeder cells and the contamination of those lineswill sign the bill and give real hope to millions of Americans.

I vield the floor.

EXHIBIT 1

THE AMYOTROPHIC LATERAL SCLEROSIS ASSOCIATION, Washington, DC, July 12, 2006.

U.S. Senate,

Washington, DC.

DEAR SENATORS: The ALS Association (ALSA) strongly supports the Senate's consideration of legislation to advance stem cell research. We are grateful for the bipartisan efforts of Senators to bring this important issue up for a vote before the August Congressional recess and are particularly appreciative of the leadership on this issue demonstrated by Majority Leader Bill Frist (R-TN) and Senator Tom Harkin (D-IA).

We understand that the Senate will consider three different stem cell initiatives during the week of July 17. We strongly urge the Senate to pass all three proposals, including H.R. 810, the Stem Cell Research Enhancement Act. These initiatives, and H.R. 810 in particular, provide our nation with the best opportunity to fully explore the promise

of stem cell research and the hope that it may lead to a treatment and cure for ALS.

The ALS Association is the only national voluntary health association dedicated solely to the fight against Amyotrophic Lateral Sclerosis (ALS), more commonly known as Lou Gehrig's disease. Our mission is to improve the quality of life for those living with ALS and to discover a treatment and cure for this deadly disease.

ALSA supports the ethical expansion of the Administration's stem cell policy as provided for in H.R. 810, permitting the use of embryos originally created for fertility treatment upon the consent of those individuals for whom the embryos were created. Importantly, the bill would arm researchers and scientists with the tools and resources they need to determine the potential embryonic stem cell research has to prevent, treat and cure countless diseases. This is especially important for people with ALS, for there is no cure for the disease and although there is one drug available to treat ALS, it only prolongs life by a few months.

The advancement of stem cell research is vital for people like Roger Gould from Ames Iowa, ALS has steadily eroded Roger's ability to control muscle movement, limiting his ability to speak, walk, move his arms and lead the type of life most all of us take for granted. Ultimately, the disease will take his life. Stem cell research provides promise to people like Roger and his wife Cindy that one day an effective treatment for ALS will be found. It also gives hope to thousands of others that ALS no longer will mean death in an average of two to five years after diagnosis: that one day we may be able to prevent ALS from taking the lives of people like Rob Borsellino, a nationally recognized columnist from Des Moines, IA who lost his battle against ALS last month, just a year after his diagnosis.

Through our innovative TREAT ALS program. The ALS Association is pursuing an aggressive strategy to advance the development of new treatments for ALS, bringing innovations from the lab to the bedside faster than ever before. Exploring the potential of stem cells is an important component of this effort. In fact, recent research funded by ALSA and published in the Annals of Neurology just this month, shows that stem cell therapy can partially restore motor function-function which ALS destroys. Other research in stem cells also show promise for ALS. While translating the promise of stem cell research into treatments and a cure for the disease continues to be a hope for the future, it is important that we explore all potential avenues for treating this horrific disease. An expansion of the current federal policy on stem cell research can only benefit the search for a treatment and cure for ALS.

Therefore, we urge the Senate to pass H.R. 810 and help ensure that people with ALS can benefit as quickly as possible from the very best that science and technology has to offer, including the potential innovations that can result from embryonic stem cell research.

Sincerely,

Steve Gibson,
Vice President, Government Relations
and Public Affairs.

The PRESIDING OFFICER. Under the previous order, the majority controls the next 30 minutes.

The Senator from Oklahoma is recognized

Mr. COBURN. Mr. President, I wish to take 5 minutes of my allotted 15 minutes to answer some of the questions raised by Senator HARKIN and Senator SPECTER.

I think it is very important that the American public understands what this debate is. We have heard a lot of statements this morning that there are no cures other than fetal stem cell research, and that could not be further from the truth. I am a practicing physician. I deliver babies. I have read almost every article published in the last 12 months on stem cells, both embryonic and nonembryonic adult. The fact is there is not one cure in this country today from embryonic stem cells.

We talked about 21 lines, but what they don't say is there is no limitation in this country at all on private research from any of the 400 lines Senator HARKIN mentioned. There also is a statement by the caretaker and many scientists that the lines are not contaminated. As a matter of fact, they are not contaminated. The question is, do we want to do what is best to get us further down the road to treat people? I am a two-time cancer survivor: I had cancer of the colon and melanoma. With the treatments that are available—I desire the treatments that can come out of stem cell research, there is no question. But every disease Senator HARKIN listed—every disease save ALS-has an adult stem cell or cord blood stem cell cure that has already been proven in humans, without using embryonic stem cells. What is the science behind it? What is the science that tells us we are going to have trouble with embryonic but not with the other? It is called the mitochondria. If you study physiology at all, what you know is every cytoplasm of every cell has mitochondria in it.

The only way to use an embryonic stem cell line and to use it effectively without falling into the trap of contamination or cross-immunization—in other words, allergy to the treatment—is to somehow quiet mitochondria. They are the energy source for cells. They have DNA. So none of the problems that are seen with your own adult stem cells or cord blood from your own child will be existing in a treatment from your own stem cells.

The reason we should spend more money on our own stem cell lines today is because there will not be complications from them as is noted in every study that has thus far been done on embryonic stem cells.

The Senator mentioned the rats. The only study that shows neurologic improvement is when the rats were sacrificed at 8 weeks. Every other study, when they let the rats live to 12 weeks, show teratoma or tumor formation, which is the problem with embryonic stem cells.

I hope the American people will listen. It is not about not getting where we want to go, but there is false hope, tremendous false hope in what we are about to do when, in fact, if we would redouble our efforts on the other areas of stem cells.

One final point and then I will yield. There is a germ cell line, stem cell line, which goes against everything Senator Harkin says. It has been proven in this country; it has been proven in Germany. It comes from ovarian tissue and testicular tissue. It is, without a doubt, the greatest thing on the horizon for us because it has none of the problems associated—I am not talking the ethical problems, I am talking the scientific problems associated with embryonic stem cells. There are none of the problems with it.

I have seen beating heart tissue from germ cell lines. It can create every area. There are three tissues, endoderm, ectoderm and mesoderm. That is the important reason why embryonic is thought to be so important.

One final point on dedifferentiation, the ability to take a cell that is in your body today and make it go backward. That has been accomplished. We now see multiple lines of pluripotent cells from our own bodies.

The choice is not destroy embryos, and if we don't, we will not get good research; the choice is go where the money is leading us, and the money is leading us into adult stem cells, germ cell lines, and other lines that have none of the problems of embryonic stem cells.

The PRESIDING OFFICER. The Senator from Kansas.

Mr. BROWNBACK. Mr. President, I thank my colleague from Oklahoma for his short, clear statement. I have some charts that will back him up.

I am delighted we are having this debate. It is time. We last debated this issue on the Senate floor in 1998. A lot has developed since then. As my colleague from Oklahoma pointed out, much of the science has passed by the embryonic stem cell and the need for embryonic stem cells, as the science has gone to adult stem cells and cord blood, and that is where the treatments are. I will show pictures of patients in that area and what is taking place.

I am delighted to be debating my colleagues. We have been debating this issue for some time. I think it is time we have a vote and look at this issue.

When I was a young Congressman first running for Congress in Chanute, KS, a young man approached me. He knew me and knew I was running for office. He said: Can you answer one question for me?

I said: I will try. I was anxious to be of help. I was anxious to prove I knew policy issues, I knew right from wrong, and I would be a good Congressman for him.

He asked me: Why is it we will fine somebody up to half a million dollars for destroying a bald eagle's egg, and yet we will fund the destruction of young humans? Why is it Federal law, both cases at that point in time, as far as the funding of abortion—I don't remember when that was changed, although now we are talking about the destruction of young human life again.

He said: Why is that?
I thought for a while. I thought: That is a good question. I don't know why

I have a picture which may seem an odd place to start this debate, but it will tie in, and I will show how. I have a picture of a bald eagle's egg and a bald eagle. If I asked my 8-year-old children what happens if I destroy this egg, will I get this eagle? they will say: No, you don't get the eagle if you destroy the egg.

Why not? That egg is not an eagle. I know, but the egg is the eagle because the eagle comes out of the egg.

Well, he doesn't look like him.

I know it is an eagle in the egg, and if you destroy the egg, you don't get the eagle. That is why we say in the Endangered Species Act, if you destroy this bald eagle's egg, you can have a maximum fine of up to half a million dollars.

I want to show some other eggs, if I can. These are human embryos, fertilized eggs. They are fertilized eggs such as this bald eagle's egg is. This one, Mother Teresa once was a human embryo. JFK was once a human embryo. Martin Luther King was once a human embryo. Ronald Reagan was once a human embryo.

Again, I think if we ask ourselves a simple question: If I destroy this, do I destroy this in the same way? Does it happen? If I destroy this human embryo—everybody on the Earth was a human embryo at some time—if I destroy that human embryo, do I somehow go ahead and get to be here anyway?

The answer, of course, again, if you ask my 8-year-old children, is: No, you don't get to be here because you destroyed the very start of your life, you destroyed the beginning of it, you destroyed that biological entity you were because the same genetic material that was there was in Ronald Reagan, and it was a unique set of genetic material, unique to him. The same for Martin Luther King, JFK, or Mother Teresa, and the billions of people around the world. We all started as a human embryo, and if you destroy the embryo, you destroy the person.

It is a unique set of genetic material right after the fertilization takes place. It doesn't matter where the fertilization takes place. It can take place in an IVF clinic or the old-fashioned way or it can take place by cloning. You still have this. You can have this, or you can destroy this and never get that. That is pretty direct, straightforward, nobody argues it. And we are not talking theology, as people try to drag this into the debate. We are talking basic biology. This is basic biology 101. If you destroy the embryo, you don't get the full-scale person. This is a genetic person, entity, special, unique, sacred, and so is this person.

My point one of this is, if we use taxpayers' dollars to fund the expansion of embryonic stem cell research, you have to inherently destroy young humans to do this, and do we want to do that? What was previously said in Dickey-Wicker was: No, we will not use taxpayers' dollars to destroy young human life. Here we would change that and say: Yes, we do; it is for a special purpose, a special reason; these are unique; these are something we are really going to get cures for. And that is my second point, cures.

The other side has talked about cures for a long period of time, and I want cures, and we are getting cures to take place. If we had taken the half a billion dollars, \$500 million that we have invested in embryonic stem cell research in animals and humans and invested that instead in adult stem cell research and cord blood research, we would probably have a lot more people in clinical trials today. We would have a lot more people, I believe, being treated and alive today if we had taken the half a billion dollars that we put, in the last 5 years, into these areas of embryonic stem cell research and put them in adult stem cells and cord blood, we would have more people alive today, walking around, experiencing treatments and I believe cures. Let me show some faces of these people.

This is a beautiful lady, Jacki Rabon. She was involved in a traffic accident. She is a paraplegic. She had to go to Portugal to get a treatment with her own adult stem cells. They are olfactory stem cells from the base of the nose. They take them out, grow them, and put them back in the spinal cord injury area. She had no feeling, no mobility, nothing below the waist. She is now getting feeling in her hips through this treatment, adult stem cells, her own stem cells. She is getting feeling in the hips and walking with the use of braces, but she had to go to Portugal to do this. Why isn't this being done in America? Why aren't we having people treated here? We are not adequately funding this area. She wants to walk and I want her to walk and she could. but we are taking money and putting them into these speculative areas when we have cures that are working. We have to go to Portugal to get them.

Let's look at this next picture. This is an amazing story. This young man is named Ryan Schneider. I hosted him at a press conference 2 hours ago. He is 3 years old, a young man with cerebral palsy. His mother saved his cord blood.

At 2 years of age, she started noticing that he was not growing and that his arms were retracting. She took him to the doctors and they said: Yes, CP; he has CP. The mother was devastated, but she would not give up.

The morning after the diagnosis, she was lying in bed and she had this a-ha moment. She said: I saved his cord blood and let's use the cord blood and treat him with the cord blood because I think that can work and get him moving again.

She called all around the country and couldn't find anybody willing to do this procedure. She was pleading with these doctors: It is simply his own cord blood, taking his own cord blood and putting it back in; this isn't going to hurt him.

They said: We can't do it, not sure, we don't have FDA protocol.

Finally, she finds a researcher at Duke University, whom we had in to testify, who said: Yes, we will do it, and the worst thing that can happen is nothing because nothing will happen, it is his own cord blood; it is not going to hurt him.

She goes down to Duke University, takes his own cord blood, and they inject it in him. This is when he was 2. He was at a press conference today. There is no retraction taking place in the arms. He has full mobility. The thing he likes to do the most is bug his 8-vear-old sister, which is what his mother said today: We like that, too, that he wants to do that. He has a word vocabulary that is normal for the age range. She said: Why isn't this an FDAapproved situation? Why are we not doing more research? Why aren't more people storing and saving cord blood so when this happens people can get cures?

Well, we haven't put enough funding into it. If we had put the half a billion more dollars into this area instead of embryonic, we might have a bunch of kids treated for CP who are not getting treated and be like Ryan running around and bugging his sister instead of having CP.

Here is a real interesting story, too, Keone Penn. We had him in to testify. He has sickle-cell anemia. He was dying. It is a real difficulty. Sickle cell is a very difficult problem to face, very painful problem for a child to face. He went through the New York Cord Blood Center, got treatment there, got a match. They had enough of a genetic match that it works for him. There are no indicators of sickle-cell anemia today. None. He isn't in Washington today, but we have had him in to testify.

We need a lot more cord blood stored. We need a lot more diversity of cord blood stored. We could use that half a billion dollars to store more cord blood and have more ethnic diversity so more people can get treated, so more people such as him will live, not die; so more people will not have to suffer what he went through. There could be real treatments with these dollars to help them.

No. 1, why are we destroying young human life? We fine people for destroying life in other forms that we want to preserve, such as the bald eagle. No. 2, why would we take this money away from current areas where we can really treat people and especially in the areas where we are not getting any treatments, we are having all the problems with tumor formation, as Dr. Coburn noted. Why are we doing that? So that fewer people are getting treatments and people are having to go overseas to get these treatments? Why? And why would we ask to do more of it now? That is what this bill is basically asking to do: That we would change Federal law so you could destroy human life with Federal taxpayer dollars. No. 2, that we would use this money, and more of it, to fund speculative areas

that even their set of scientists are saying are a minimum of a decade or two away from treatments which we are not getting, and we have taken away from Keone Penn, and treatments that he could get. Why? What sense does that make?

In 1943, C.S. Lewis delivered a series of lectures-this is the gentleman who did the Narnia series that has been made into a movie that a lot of young people have seen and read the Narnia series books, along with a lot of other pieces—a brilliant writer and a brave man. He did a lecture series called "The Abolition Of Man" in 1943, a very forward-looking series, and he noted at one point: "If man chooses to treat himself as raw material, raw material he will be." It echoes themes of what we are hearing today. I don't give anybody over to a bad heart. I think everybody wants cures. I want cures. I see a way we can get treatments and hopefully cures. I want things done ethically. I don't give anybody over to a bad heart. But what we are doing is treating man as raw material—raw material to feed into a system that we hope will produce some results.

Unfortunately, it is not the first time we have in human history that we have treated people as raw material. We have frequently, in the past, subjected the weaker to the will of the stronger, and we have always regretted it afterwards. We shouldn't do that today. It shouldn't have happened then, and we don't need to do it now. We are talking about the embryo, the young human

I want to go through a couple of these points about what it is we are talking about. President Clinton's bioethics board defined young human life—and I want to give their definition for it. The National Bioethics Advisory Commission says that an embryo is: "The developing organism from the time of fertilization—"until significant differentiation has occurred, when the organism then becomes known as a fetus." So it is an embryo by that Presidential advisory bioethics analysis.

And here is a definition taken from a textbook, the Human Embryology textbook states:

Although life is a continuous process, fertilization is a critical landmark because, under ordinary circumstances, a new, genetically distinct human organism is thereby formed. The combination of 23 chromosomes present in each pronucleus results in 46 chromosomes in the rygote

mosomes in the zygote.

Thus the diploid number is restored and the embryonic genome is formed. The embryo now exists as a genetic unity.

That isn't SAM BROWNBACK saying this, this is Human Embryology, Third Edition, saying that.

We have a distinct genetic entity once it is formed. It doesn't matter the location. It can be the old-fashioned way, as I noted at the outset, via the human body; in vitro fertilization; it can be what some refer to as somatic cell nuclear transfer, SCNT, or what most refer to as human cloning. It is a separate entity.

Pioneer stem cell researcher Jamie Thompson goes further. He says of human cloning: "By any reasonable definition, you're creating an embryo. If you try to define it away, you're being disingenuous." Jamie Thompson. So we are talking about a human embryo.

Now, some would say it is not big enough to be human life. Here I want to make a point, on this chart, if I could. My colleagues made the point that the human embryo is about this big; very small at its beginning of life. Therefore, because it is small and is fragile and it can't do anything on its own, you know, it is really not human life. And we should be able to destroy it, for a good purpose. We are doing this for a good purpose. This isn't us being malicious; we are doing this for a good purpose. Well, the interesting thing about that, as I said at the outset—of course, when you destroy this. you never get the full human at any point in time. This is a separate genetic entity, even at this point in time. Also, the point was made to me one time that if the Big Bang theory is correct, then at one point in time, this is the size of the universe. Then it is all condensed down, this much matter is condensed down to that infinitesimal. small size before it blows. So I guess if you destroy it then, it doesn't become the universe, but that doesn't matter. It is too small to be seen as significant, and it can't do anything on its own. It sits in a frozen state, and because it can't take care of itself, because it can't grow, because it can't breathe in this situation, then it is not humanbecause it can't care for itself, because it is too fragile. It doesn't breathe. It doesn't do some of the things that we give over to the presence of life.

I want to give some examples, real quick, of young people-let's use this one. This is Isaiah Sullivan Royal, born to Hannah and Jed Royal. Hannah works in my office. Isaiah was born significantly premature. As you can see, he is a fighter. He is a tough little guy. He has been through a lot-more medical treatments than most people would have gone through in their lifetime already. Without human intervention, without help, he doesn't survive and make it. Yet he is a young human, and he is beautiful. Talk to his parents about him. So the idea that just because of smallness, you can't take care of yourself doesn't make you human, is completely false. Do we want to say that because you are young and small and weak, you are worthless or helpless or you are not human, which would be even worse? That just doesn't stand. That doesn't stand to reason. Yes, human life is fragile, but it is of infinite worth and it is of infinite value.

I want to now look at the overall issue of where we are with adult stem cell work. Dr. COBURN hit on this area, and I want to put some more points to it. We have, by peer review articles, 72 different areas, different human maladies being treated with adult stem cells

or with cord blood—72. There was recently an article in one of the magazines saying: Well, we don't think the number is actually 72, it may be 68, it may be this or that.

We can wait a day or two and it will be up to 72 because there are more coming out in all of the areas. Some people are quibbling and saying: Well, these are not in FDA treatment trials. That is true, a number of them are not because we don't have sufficient funding. A half a billion dollars would really help us to move that along to get these in FDA treatment trials. These are in human clinical applications, where there are human beings treated for 72 different maladies by adult stem cells or cord blood—72, and for embryonic, we have zero.

We have known about embryonic stem cells in mice for 25 years. We have not been able to get them to work in this situation. They form tumors and they are rapid growing. With adult stem cells we know what they are about, we know what they are doing, and they are working, and people are being treated: 72 adult stem cell treatments to zero embryonic treatments. Again, you can quibble that they are not in FDA trials, not available to everybody. That is true. A lot of people are having to go overseas for treatments in some cases, and in some cases they are actually treatments that were developed in the United States, but because of FDA approval processes being long, they are having to get treatment overseas, even though the process was developed here.

I want to show you the specific areas, and this is—I am breaking the rules on charts because this one has—this one is too busy, but it is the only way I can get it all on one chart: 72 current human clinical applications using adult stem cells.

As I said, we could wait a week or 2 weeks, it will be more. Here are some of the amazing ones: Bladder diseases, they are developing, actually growing bladders with your own stem cells for people who have had bladder cancer or something of that nature, they are able to actually form a shell structure and the cells grow around it. The ones I like the best are in the heart areas, the cardiovascular. I had David Foege speaking at a press conference we had, he could hardly walk, advanced stroke, because of his heart problem, no infracturing rate. The physicians—I am sure I am butchering the words—I am a lawyer. I apologize for that. But he got this treatment, and he went first to a place in the United States, and they said: Look, you are just too advanced in your problematic stage. We are not going to treat you here because we want to treat early on and we only have so much money and we could use more, but we only have so much.

So the guy goes to Thailand for the treatment—it may have been developed in the United States. I am not certain that it was developed in the United States, but it is used here but only on

people with great opportunity to make it through. He goes to Thailand, gets this treatment. His indicators of what happened to him in the stroke are diminishing. He is out walking. He spoke at the press conference that we had, and this man has got life again. Otherwise, he would, in all probability, be dead today. And how many people are like him, that because we have slowed the development of the adult field down by putting so many of our resources in the nonproductive embryonic area, and we are getting interesting science, but with adult we are talking about real people now. We are talking about real lives of individuals. How many more of them can get treated, and how many people can afford to fly to Bangkok to get this treatment? How many are able to do that? Yet they could go somewhere in the United States, I mean, my goodness, I hope we start thinking about the people involved in this and seeing the success in so many various and different fields. I think it is important we would do that.

Mr. President, I want to point out we will have, as my colleagues know, three votes that will be taking place. I do hope people will support the fetal farming ban. We shouldn't be growing young fetuses and using them for research, period. Some people are wanting to grow them further, cells differentiate and use it then. What we are talking about is an actual ban on that. I am hoping my colleagues will support that because we should not be doing that. I hope everybody would see that there is a huge moral dilemma with doing that. It is a bill that will be put forward. There is an alternative bill coming up with these pluripotent cells that I am hoping my colleagues can

support.

The focal point is this, do we use taxpayer dollars, Federal taxpayer dollars, to destroy young human life for research purposes? I would hope it is seen that we could develop and put forward a very clear argument and rationale as to why you shouldn't do that. It is illegal. The Dickey-Wicker appropriations language, to start off with, that is the law we previously passed. It is immoral. We shouldn't use a weaker person for the benefit of a stronger person. And it is unnecessary. That is actually the beauty of it. We are presenting false choices to people. The choice that works has no ethical problem, and we can get broad-based support for it. Then, we can have more Jacki Rabons, Ryan Schneiders, and Keone Penns who are getting treatments now, and their lives are being saved, people staying in the United States for treatment rather than going overseas for the treatment, and we have got a lot of people being successfully treated and hopefully

I may use that term "cured" too loosely because these are at the early stages. These are treatments that are showing enormous promise, but we can't-they are not, many of them are not in any sort of FDA-approved trial, so we can't use that term "cure." But we have a lot of successes.

The other road that is being talked about is the use of human life as raw material, and if we do that, raw material we will be. We will cheapen life. And we cheapen life any time we use it for anything other than the sacredness that life is. I hope, at the end of the day, that would be the thing we grab onto. Clearly, embryonic stem cell research is unnecessary. We don't want to cheapen human life.

Mr. COBURN. Mr. President, would the Senator yield for a question?

Mr. BROWNBACK. I am happy to

Mr. COBURN. Is there any prohibition in the United States today for private money to fund any type of fetal research, embryonic stem cell research?

Mr. BROWNBACK. Reclaiming my time, no, there is not. There is no limitation today on State dollars, private dollars, foreign dollars, whatever you want to call it.

Mr. COBURN. As a matter of fact. California passed, I think, Proposition 71: \$500 million over the next 10 years in fetal stem cell research?

Mr. BROWNBACK. I think actually the number is \$3 billion.

Mr. COBURN. Three billion dollars. So there is no limitation at the present time.

Mr. BROWNBACK. None whatsoever. Mr. COBURN. Is the Senator aware of the private investment dollars that are presently—the private investment dollars-not Government dollars, not State dollars—that are now going into embryonic stem cell research versus adult stem cell and germ line stem cell and cord blood, the ratio is about 100 to

Mr. BROWNBACK. Mr. President, reclaiming my time, it is, and it is a very interesting feature that where the private money is going, where people have to show production coming out of it, it is all going into the adult cord blood because people know the science. And that is why I want to conclude with what I started with.

In many respects, the science has passed this debate by. The science is saving: Do the adult, do the cord blood. The embryonic is not working, and you have enormous ethical problems with doing that, and we don't need to go that way. That is where the private dollars then are going, which I would hope my colleagues would look at as

Mr. President, I vield the floor.

The PRESIDING OFFICER. Under the previous order, the minority controls debate for the next 30 minutes.

Mr. LEVIN. Mr. President, I don't know if there is a fixed order for the minority. If not, I will yield myself 15 minutes.

The PRESIDING OFFICER. The Senator from Michigan is recognized.

Mr. LEVIN. We stand at the threshold of a new era of medical discovery. We can already glimpse the dramatic lifegiving advances in regenerative medicine that lie ahead, but we remain mired down at this point with breakthroughs on the horizon but not within reach unless we change the President's policy on stem cell research.

Embryonic stem cell research could hold the key to curing diseases that no other research can cure. As best we know now, an embryonic stem cell is unique in nature. It and it alone can develop into any other type of cell in the body. An embryonic stem cell and an embryonic stem cell alone can become a nerve cell, a muscle cell, or any of the more than 200 types of cells in the body. The research into directing the creation and use of these cells may be extraordinarily difficult, but it is easy to understand how creating healthy cells could replace diseased cells and could save an untold number of lives.

One example of the possibilities of stem cell research is the hope that it offers for those suffering from Parkinson's disease. Parkinson's disease is a motor system disorder that results from a loss of brain cells that produce dopamine. Individuals with Parkinson's disease often experience a trembling in the hands or arms or face and impaired balance and coordination. As the disease develops, it can become difficult to walk, talk, and complete other basic tasks. With research, scientists may be able to coax embryonic stem cells into becoming healthy neurons that produce the desperately needed dopamine. And if those neurons can be successfully transplanted into a patient with Parkinson's disease, that person could be cured.

The list of other diseases ripe for stem cell research is long. Lou Gehrig's diseased is a progressive neuromuscular disease characterized by a degeneration of the nerve cells of the brain and spinal cord. Juvenile diabetes is an autoimmune disease in which the immune system attacks the pancreas, destroying insulin-producing cells.

Alzheimer's disease is a form of dementia that afflicts the part of the brain that controls memory, language, and thought. Spinal cord injuries interrupt the sensory pathway between the brain and the rest of the body.

Now, imagine if embryonic stem cell research could produce replacements for the nerve cells ravaged by Lou Gehrig's disease, for the insulin-producing cells destroyed by diabetes, for the brain cells washed away by Alzheimer's, for the neural pathways severed by spinal cord injuries. Stem cell research could offer the millions of Americans suffering from these and other diseases not just hopes but cures. It could give them and their families who are often physically, financially, and emotionally exhausted—their lives back.

Many technical hurdles stand in the way of that day. These discoveries will not be easy. But it is wrong to throw additional and unnecessary obstacles

in front of our doctors, researchers, and scientists. That is precisely, however, what the President's policy has done.

On August 21, 2001, President Bush issued an Executive order that the Federal Government would only fund embryonic stem cell research on stem cell lines created before that date. "Stem cell line" is the name given to constantly dividing cells that continue to be derived from a single embryo. Most independent experts estimated at the time of the President's Executive order that only 80 stem cell lines, a totally inadequate amount, would be available for Federal research. Even worse, most of those 80 lines were determined to be polluted and unusable, leaving only about 20 stem cell lines actually available to scientists. That number is far too small to tap the vast potential of this research.

The President did not question the legitimacy of the science being used in stem cell research but the ethics of using embryos, scientifically known as blastocysts, until implanted through in vitro fertilization. A blastocyst consists of around 150 cells, which is smaller than the point of a pin. While the blastocyst is destroyed during the process of extracting embryonic stem cells, the key fact is that any that are used for stem cell research would have been discarded and destroyed anyway. That is a fact that opponents refuse to deal with.

These blastocysts are created by in vitro fertilization clinics and, for a variety of reasons, will not be used for implantation and will, therefore, eventually be discarded.

Last month, the Detroit News editorialized against a Michigan law restricting embryonic stem cell research and used words that equally apply to the President's policy. The News wrote:

The justification for this law is to protect human embryos, but the fact that fertility clinics can simply discard them means that the research ban is pointless.

The logic of some embryonic stem cell research opponents is totally befuddling. They are apparently willing to ignore the discarding of the embryos by fertility clinics, but they label as morally objectionable the lifegiving use of embryos which would otherwise be discarded. I believe that embryonic stem cell research is truly a lifegiving, not a life-destroying, process because of the extraordinary potential for healing living, breathing human beings who have names and faces and loved ones.

While the President is fighting against research in America, other countries are pressing ahead. America has always been at the forefront of scientific innovation, and we could do this research faster, more efficiently, and more ethically than most other countries. We also have an obligation to speed its potential benefits to the American people and to people around the world.

The President's policy, however, has stifled private-public partnerships and has hindered our potential impact in this area. Today, other countries are poised to reap the lifegiving rewards of stem cell research while we fall further behind

Over a year ago, the House took a significant step toward overcoming Presidential opposition by passing the Stem Cell Research and Enhancement Act, H.R. 810, which would remove the President's arbitrary prohibition against using stem cells created after August 21, 2001. That is another fact that opponents refuse to deal with. The President's date of August 21, 2001, is breathtakingly illogical. How can the President argue that it is OK to use embryos created before that date for research, even though in his view it was the taking of a life but that after that date it is unethical to do so?

H.R. 810 would pave the way for hundreds or thousands of additional stem lines to be made available. It is bipartisan legislation, and it passed overwhelmingly in the House.

Shortly after the House made its strong statement in favor of exploring the medical potential of embryonic stem cell research, the Senate majority leader committed to bringing that bill up for floor consideration. Senator FRIST understands how great the lifeenhancing possibilities are, and he has chosen to side with his fellow physicians and with the future in supporting this research.

This bill has the strong support of the American Medical Association, the Coalition for the Advancement of Medical Research, the Association of American Universities, the Christopher Reeve Foundation, the Juvenile Diabetes Research Foundation, the Leukemia and Lymphoma Society, the Parkinson's Action Network, and more than 200 additional organizations. More important, it has the overwhelming support of the American people. If the President vetoes this bill, I hope we will resoundingly override his veto.

As part of the unanimous consent agreement to consider this legislation, we are considering two additional bills as well. The bill put forward by Senators Santorum and Specter would emphasize the use of adult stem cells instead of embryonic stem cells. Adult stem cells may have some potential, but they do not have the critically essential ability of the embryonic stem cell to become any other type of cell.

Dr. Sean Morrison, the director of the University of Michigan's Center for Stem Cell Biology, and one of the top stem cell researchers in the country, wrote recently in the Detroit Free Press about another alternative to embryonic stem cells being touted, adult stem cells from umbilical cords. Dr. Morrison wrote:

Umbilical cord cells are used clinically only to replace blood-forming cells. There is no compelling evidence that these cells could ever be used to replace cells in other tissues. These cells are not an alternative to embryonic stem cells, which can replace any cell type in the body. . . . That is why there is near universal agreement among respected

scientists and patient advocacy groups that current restrictions [against embryonic stem cell research] should be relaxed.

We may be on the cusp of one of the greatest miracles in the history of medicine. The door of possibility is ajar, inviting us to enter. But we cannot make these great strides if our researchers continue to be hampered by President Bush's overly restrictive policy. We owe it to everybody suffering from—or who may in the future be afflicted by—these dread diseases to move boldly toward a brighter future.

I yield the floor.

The PRESIDING OFFICER. The Senator from South Dakota is recognized.

Mr. JOHNSON. Mr. President, today I speak in support of legislation this Chamber has been waiting to consider for more than a year. I am pleased that wait is finally over. I encourage my colleagues to join me in voting to give hope to millions of Americans living with diseases for which embryonic stem cell research offers their only real hope of a cure. These patients are often desperate and have been waiting for their Congress to take action for nearly 5 years, since August 9, 2001, when the President defied common sense and stifled the promise and the hope offered by stem cell research.

This essential legislation has already passed the House of Representatives by an overwhelmingly large bipartisan majority. Today, I want to briefly share my thoughts on why the current policy on stem cell research is unsustainable and woefully inadequate, clarify some misconceptions about the Stem Cell Research Enhancement Act, and share the stories of some South Dakotans who will enormously benefit from the passage of this bill.

Current law allows federally funded research on only those stem cells derived as of August 9, 2001. At the time, there were more than 65 stem cell lines available worldwide. While this number represented marvelous progress from the first derivation of an embryonic stem cell in 1998, we know now that it was just the tip of the iceberg of possibility.

Today we know only 22 of those first 65 lines are viable for research, and virtually none will produce medical therapies permitted for use in humans. This is because at the time the only way to maintain stem cell lines was to use mouse cells to help them grow. Since then, scientists working with private funds—and no thanks to the Federal Government—have developed stronger and more robust stem cell lines that are not dependent on mouse cells and could lead to therapies for actual use in humans.

We must open these new lines to research supported by Federal funding. The United States is home to the world's largest and most distinguished organizations dedicated to maintaining and improving health through medical science. The National Institutes of Health and the Centers for Disease Control and Prevention conduct research that is critical to understanding

human disease and its treatment. These centers rely on Government funding to continue their work, and if we do not fund their research on embryonic stem cell lines, the United States will fall behind the rest of the world in scientific and medical advancement. If the Stem Cell Research Enhancement Act does not become law, we not only risk the futures of Americans living with currently incurable diseases, we also risk our national reputation as the home of the world's most innovative and distinguished scientists working to improve the health.

This is not just a matter of international medical research prestige; it directly goes to the millions of families around the world who will at last have hope that we can conquer the planet's most awful diseases and injuries.

The Stem Cell Research Enhancement Act creates a closely monitored and controlled stem cell research effort. The bill will allow vital, life-giving research to progress using frozen fertilized embryos that would otherwise be incinerated as medical waste. The choice is simple: life-giving research or incineration of excess cells.

Stem cell research is conducted with egg cells fertilized in a laboratory for the sole purpose of assisting childless couples who wish to have a baby. After choosing embryos for implantation in the mother, the remainder are routinely destroyed as medical waste. I believe these cells, of which hundreds of thousands are now stored at fertility clinics, would be better used to advance medical research that holds great promise for curing or preventing some of the world's worst diseases, as well as for repairing spinal cord and other injuries. I believe choosing research over incineration is a moral choice.

My South Dakota values, my religious faith, and my commitment to South Dakota families tell me we must choose life-giving research over incineration of these cells.

The Stem Cell Research Enhancement Act imposes tighter ethical rules than exist under current law. Any donated embryos must be created solely for fertility treatment and must be in excess of the clinical need of those seeking fertility treatment. Furthermore, the bill requires written consent from those who wish to donate the embryonic cells and prohibits financial incentives for donation.

Stem cells in umbilical cord blood have provided effective therapies for diseases such as leukemia and sickle cell anemia. However, there are many other diseases, including type 1 diabetes, Alzheimer's, and Parkinson's, which doctors cannot treat or cure with cord blood stem cells. Because of this fact, we must advance research in other areas, including embryonic stem cell research, to access all available options for curing the debilitating diseases plaguing so many of our fellow Americans.

Earlier, I mentioned that this bill gives hope to millions of Americans

living with diseases for which embryonic stem cell research offers the only hope for a cure. I have been honored to meet many of these individuals in my home State of South Dakota.

This bill gives hope to 3-year-old Alexander Sohl from Brandon, SD. His parents, Terry and Laurie, told me little Alexander's very first words were not "mommy" or "daddy" but "no shot"—his insulin treatments began when he was just a baby. And it is stem cell research that gives his family hope that the daily inflicted pain and the threat to the very life of this small child can at last end.

This bill gives hope to Bonnie Younkin. Bonnie lives in Huron, SD, and was diagnosed with Parkinson's disease in 2002 when she was in her early 50s. Though living with her disease is a daily battle, Bonnie also serves as an advocate for awareness of the disease and increased funding for Parkinson's research as the State's action coordinator. It can run in families; Bonnie is the fourth female in her family diagnosed with Parkinson's, and she lives in fear that her three daughters and one granddaughter may have a similar diagnosis in their future. Bonnie called my office last week, to touch base in advance of this debate. Upon hearing that I remained committed to supporting this bill, she had just two words, "Bless you."

South Dakota families are desperate for this research to commence—and to proceed.

Choosing research over incineration is a moral choice. I have prayed about this issue, and my deeply held religious faith tells me that respect for human life, respect for God's children, requires this life-saving research to proceed rather than the continued incineration of frozen excess embryo cells that are sitting in fertility clinics classified as medical waste.

Let there be no mistake: There are three bills being considered by the Senate this week. But unless a Senator votes for H.R. 810, the Stem Cell Research Enhancement Act, he or she will not have voted for this meaningful lifegiving research.

I urge my colleagues to join me in affirming that respect—that respect for life—by voting for the Stem Cell Research Enhancement Act. Choose research and life over incineration.

I yield the floor.

The PRESIDING OFFICER. Under the previous order, the minority is recognized.

Mr. HARKIN. Mr. President, I have a letter from a number of different groups endorsing H.R. 810. It is patient advocacy groups, health organizations, research universities, scientific institutes, religious groups, and others. There are 205 groups listed here. I will not go through all of them, obviously, but I think it is important that all of these groups be laid upon the RECORD. I ask unanimous consent that the letter be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

JULY 14, 2006.

U.S. Senate, Washington, DC.

DEAR SENATOR: We, the undersigned patient advocacy groups, health organizations, research universities, scientific societies, religious groups and other interested institutions and associations, representing millions of patients, scientists, health care providers and advocates, write you with our strong and unified support for H.R. 810, the Stem Cell Research Enhancement Act. We urge your vote in favor of H.R. 810 when the Senate considers the measure next week.

Of the bills being considered simultaneously, only H.R. 810 will move stem cell research forward in our country. This is the bill which holds promise for expanding medical breakthroughs. The other two bills—the Alternative Pluripotent Stem Cell Therapies Enhancement Act (S. 2754) and the Fetus Farming Prohibition Act (S. 3504)—are NOT substitutes for a YES vote on H.R. 810.

H.R. 810 is the pro-patient and pro-research bill. A vote in support of H.R. 810 will be considered a vote in support of more than 100 million patients in the U.S. and substantial progress for research. Please work to pass H.R. 810 immediately.

Sincerely,

Accelerated Cure Project for Multiple Sclerosis; Affymetrix, Inc.; Alliance for Aging Research: Alliance for Stem Cell Research; Alpha-1 Foundation; ALS Association; Ambulatory Pediatric Association; American Academy of Neurology; American Academy of Pediatrics; American Association for Cancer Research; American Association for Dental Research; American Association for the Advancement of Science; American Association of Neurological Surgeons/Congress of Neurological Surgeons; American Autoimmune Related Disease Association; American Brain Coalition; American College of Neuropsychopharmacology; American College of Obstetricians and Gynecologists; American Council on Education; American Council on Science and Health; American Dental Education Association.

American Diabetes Association; American Gastroenterological Association; American Medical Association; American Medical Women's Association; American Pain Foundation; American Parkinson's Disease Association (Arizona Chapter); American Parkinson's Disease Association: American Pediatric Society; American Physiological Society; American Society of Clinical Oncology; American Society for Biochemistry and Molecular Biology; American Society for Cell Biology; American Society for Clinical Pharmacology and Therapeutics; American Society for Microbiology; American Society for Neural Transplantation and Repair; American Society for Reproductive Medicine; American Society of Critical Care Anesthesiologists; American Society of Hematology; American Surgical Association; American Surgical Association Foundation.

American Thyroid Association; A O North America; Association for Prevention Teaching and Research; Association of Academic Chairs of Emergency Medicine; Association of Academic Departments of Otolaryngology; Association of Academic Physiatrists; Association of American Medical Colleges; Association of American Universities; Association of Anatomy, Cell Biology and Neurobiology Chairs; Association of Independent Research Institutes; Association of Medical School Microbiology and Immunology Chairs; Association of Medical School Pediatric Department Chairs; Association of Medical School Pharmacology Chairs; Association of Professors of Medicine; Association of Reproductive Health Professionals; Association of Specialty Professors;

University Anesthesiologists; Axion Research Foundation; Biotechnology Industry Organization; B'nai B'rith International.

Broadened Horizons, LLC; The Burnham Institute; California Institute of Technology; California Institute for Regenerative Medicine; Californians for Cures; Campaign for Medical Research; Cancer Research and Prevention Foundation; C3: Colorectal Cancer Coalition; Cedars-Sinai Health System: Central Conference of American Rabbis; Chil-Children's drens Hospital Boston; Tumor Foundation: Children's Neurobiological Solutions Foundation: Christopher Reeve Foundation: The CJD Foundation; Columbia University Medical Center; Cornell University; CuresNow; Cure Paralysis Now; David Geffen School of Medicine at UCLA.

Duke University Medical Center; Elizabeth Glaser Pediatric AIDS Foundation; Emory University; The Endocrine The FAIR Society: Foundation: FasterCures; FD Hope Foundation; Federation of American Societies for Experimental Biology (FASEB); Fertile Hope; Fox Chase Cancer Center; Friends of Cancer Research; Genetics Policy Institute; The Gerontological Society of America: Hadassah: Harvard University: Hereditary Disease Foundation; Huntington's Disease Society of America: Institute for African American Health, Inc.; International Foundation for Anticancer Drug Discovery (IFADD): International Longevity Center—USA.

International Society for Stem Cell Research; Iraq Veterans for Cures; Jeffrey Modell Foundation; Johns Hopkins; Joint Steering Committee for Public Policy; Juvenile Diabetes Research Foundation; Lance Armstrong Foundation; Leukemia and Lymphoma Society; Lung Cancer Alliance; Lupus Research Institute; Malecare Prostate Cancer Support; Marshalltown [IA] Cancer Resource Center: Massachusetts Biotechnology Council; Memorial Sloan-Kettering Cancer Center; The Michael J. Fox Foundation for Parkinson's Research; Mount Sinai School of Medicine: National Alliance for Eve and Vision Research; National Alliance on Mental Illness; National Association for Biomedical Research: National Caucus of Basic Biomedical Science Chairs.

National Coalition for Cancer Research;
National Coalition for Cancer Survivorship; National Coalition for Women
with Heart Disease; National Council
of Jewish Women; National Council on
Spinal Cord Injury; National Health
Council; National Hemophilia Foundation; National Medical Association; National Partnership for Women and
Families; National Prostate Cancer Coalition; National Spinal Cord Injury
Association; National Venture Capital
Association; New Jersey Association
for Biomedical Research; New York
Stem Cell Foundation;

versity School of Medicine; North American Brain Tumor Coalition; Northwest Association for Biomedical Research; Northwestern University; Paralyzed Veterans of America; Parkinson's Action Network.

The Parkinson Alliance and Unity Walk; Parkinson's Disease Foundation; Pittsburgh Development Center; Project A.L.S.: Pseudoxanthoma Elasticum International Quest for the Cure; Research!America; Resolve: The National Infertility Association; RetireSafe; Rett Syndrome Research Foundation; Rice University Robert Packard Center for ALS Research at Johns Hopkins Rutgers University: Secular Coalition for America; Society of General Internal Medicine; Society of Gynecologic Oncologists; Society of Reproductive Surgeons; Society of University Otolaryngologists; Society for Assisted Reproductive Technology; Society for Education in Anesthesia

Society for Male Reproduction and Urology; Society for Neuroscience; Society for Pediatric Research: Society for Reproductive Endocrinology and Infertility: Society for Women's Health Research; Stanford University; Stem Cell Action Network: Stem Cell Research Foundation; Steven and Michele Kirsch Foundation; Stony Brook University, State University of New York; Student Society for Stem Cell Research; Take Charge! Cure Parkinson's, Inc.; Texans for Advancement of Medical Research; Texas Medical Center; The Forsyth Institute; Tourette Syndrome Association; Travis Roy Foundation; Tulane University; Union for Reformed Judaism; Unitarian Universalist Association of Congregations.

University of California, Berkeley; University of California, Davis; University of California, Irvine; University of California, Los Angeles; University of California, San Diego; University of California, San Francisco; University of California, Santa Cruz; University of California System; University of Chicago; University of Illinois; University of Iowa: University of Michigan: University of Minnesota: University of North Carolina at Chapel Hill: University of North Dakota; University of Oregon; University of Pennsylvania School of Medicine; University of Rochester Medical Center; University of Southern California; University of Washington.

University of Wisconsin-Madison; Vanderbilt University and Medical Center; Washington University in St. Louis, WE MOVE, WiCell Research Institution, Wisconsin Alumni Research Foundation; Wisconsin Association for Biomedical Research and Education; Woodruff Health Sciences Center at Emory University; Yale University.

Mr. HARKIN. Mr. President, I have a letter from the American Society for Cell Biology. The letter was sent to Senator HATCH, dated July 17. It says:

The Senate will shortly be considering legislation to permit the National Institutes of Health (NIH) to fund research with additional and new and existing human embryonic stem cell (hESC) lines. As staunch supporters of biomedical research and particularly research with hESCs, we trust that you will exert your influence to ensure passage of H.R. 810. Scientists engaged in ESC research are counting on you and like-minded Senate colleagues to assure its passage.

The President must also be persuaded not veto this legislation for if we continue on the

path he set five years ago, United States investigators will be out of the running in coverting embryonic stem cells into important new therapies. It is especially frustrating and demeaning that American scientists are prohibited from using their NIH grant funds for research with the hundreds of hESC lines generated outside the United States or generated in this country with private funding.

I note there are 27 leading scientists on this letter, 17 of them having received the Nobel Prize for medicine in one form or another.

I ask unanimous consent that this letter be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

THE AMERICAN SOCIETY FOR
CELL BIOLOGY,
Bethesda, MD, July 17, 2006.

Hon. ORRIN HATCH, U.S. Senate.

Washington, DC.

DEAR SENATOR HATCH: The Senate will shortly be considering legislation to permit the National Institutes of Health (NIH) to fund research with additional and new and existing human embryonic stem cell (hESC) lines. As staunch supporters of biomedical research and particularly research with hESCs, we trust that you will exert your influence to ensure passage of H.R. 810. Scientists engaged in ESC research are counting on you and like-minded Senate colleagues to assure its passage.

The President must also be persuaded not to veto this legislation for if we continue on the path he set 5 years ago, United States investigators will be out of the running in converting embryonic stem cells into important new therapies. It is especially frustrating and demeaning that American scientists are prohibited from using their NIH grant funds for research with the hundreds of hESC lines generated outside the United States or generated in this country with private funding.

erated in this country with private funding. Also, S. 2754, the "Alternative Pluripotent Stem Cell Therapies Enhancement Act," sponsored by Senators Specter and Santorum, seems to us, superfluous. Ostensibly, it is intended to authorize research "to derive human pluripotent stem cell lines using techniques that do not harm embryos." However, at present, such research is currently permissible and, therefore, does not require congressional legislation; indeed, the National Institutes of Health may currently be funding such efforts.

Moreover, all the alternative procedures advanced in the report by the President's Council on Bioethics and other alternative methods that have been suggested encounter equally vexing ethical concerns. Hence, S. 2754 is unneeded and if passed would deflect from the current urgent need for generating new stem cell lines from excess IVF-derived blastocysts.

Sincerely,

Peter Agre, M.D., Vice Chancellor for Science and Technology, James B. Duke Professor of Cell Biology, Duke University School of Medicine, Nobel Prize in Chemistry, 2003.

Bruce Alberts, Professor of Biochemistry and Biophysics, University of California, San Francisco, President Emeritus, National Academy of Sciences.

Mary C. Beckerle, Ph.D., Ralph E. and Willia T. Main Presidential Professor, University of Utah, President, American Society for Cell Biology.

David Baltimore, President, California Institute of Technology, Nobel Prize in Physiology or Medicine, 1975.

Paul Berg, Cahill Professor of Biochemistry, Emeritus, Stanford University, Nobel Prize in Chemistry, 1980.

J. Michael Bishop, Nobel Prize in Physiology or Medicine, 1989.

Helen M. Blau, Ph.D., Donald E. and Delia B. Baxter Professor, Director, Baxter Laboratory in Genetic Pharmacology, Stanford University School of Medicine.

Michael S. Brown, M.D., Nobel Prize in Physiology or Medicine, 1985.

Linda Buck, Ph.D., Howard Hughes Medical Institute, Division of Basic Sciences, Fred Hutchinson Cancer Research Center, Nobel Prize in Physiology or Medicine, 2004.

Johann Deisenhofer, Regental Professor, Investigator, Howard Hughes Medical Institute, The University of Texas Southwestern Medical Center, Nobel Prize in Chemistry, 1988.

Joseph L. Goldstein, M.D., Regental Professor of Molecular Genetics and Internal Medicine, University of Texas Southwestern Medical Center at Dallas, Nobel Prize in Physiology or Medicine, 1985.

Larry Goldstein, Investigator, Howard Hughes Medical Institute, Department of Cellular and Molecular Medicine, University of California, San Diego School of Medicine. Alfred G. Gilman, M.D., Ph.D., Dallas, Texas, Nobel Prize in Physiology or Medicine, 1994.

Paul Greengard, Professor, The Rockefeller University, Nobel Prize in Physiology or Medicine, 2000.

Lee Hartwell, Ph.D., President and Director, Fred Hutchinson Cancer Research Center, Nobel Prize in Physiology or Medicine, 2001.

Dudley Herschbach, Baird Research Professor of Science, Harvard University, Nobel Prize in Chemistry, 1986.

H. Robert Horvitz, Professor of Biology, Massachusetts Institute of Technology, Nobel Prize in Physiology or Medicine, 2002. Douglas Koshland, Carnegie Institution, Investigator, Howard Hughes Medical Insti-

Paul C. Lauterbur, Center for Advanced Study Professor of Chemistry and Distinguished Professor of Medical Information Sciences, University of Illinois, Nobel Prize for Physiology or Medicine, 2003.

Sean J. Morrison, Investigator, Howard Hughes Medical Institute, Director, Center for Stem Cell Biology, University of Michigan.

Eric N. Olson, Department of Molecular Biology, University of Texas, Southwestern Medical Center at Dallas.

Thomas D. Pollard, M.D., Sterling Professor and Chair, Molecular Cellular and Developmental Biology, Yale University.

Randy Schekman, HHMI Investigator, Dept. of Molecular and Cell Biology, University of California, Berkeley.

Phillip A. Sharp, Institute Professor and Center for Cancer Research, Massachusetts Institute of Technology, Nobel Prize in Physiology or Medicine, 1993.

Maxine F. Singer, A.B., Ph.D., D.Sc., President Emerita, Carnegie Institution of Washington.

Harold Varmus, M.D., President, Memorial Sloan-Kettering Cancer Center, Chair, Joint Steering Committee for Public Policy, Former Director, National Institutes of Health, Nobel Laureate in Medicine or Physiology, 1989.

Eric Wieschaus, Department of Molecular Biology, Princeton University, Nobel Prize in Physiology or Medicine, 1995.

Mr. COBURN. Mr. President, will the Senator yield for a question?

Mr. HARKIN. Yes.

Mr. COBURN. Is the Senator aware of the research that has been done on juvenile diabetes thus far in terms of embryonic stem cell research and adult stem cell research?

Mr. HARKIN. I am not intimately knowledgeable of all of the nuances in research that is being done. We had hearings, and we have the information in our hearing record on a lot of that. Standing here now, I don't know all of that.

Mr. COBURN. Is the Senator aware that the only successful treatments for juvenile diabetes to come from stem cells have come from adult stem cells, and in fact that the embryonic stem cells have one-fiftieth the amount of insulin, were not effective, and ended after about 80 days after transplantation? Is the Senator aware of that?

Mr. HARKIN. Will the Senator repeat that? I was reading something.

Mr. COBURN. Is the Senator aware that of the human studies which have thus far been done on juvenile diabetes in fact the successful one was adult stem cells and the unsuccessful one was embryonic stem cell? Is the Senator aware of that fact?

Mr. HARKIN. Let me respond this way: First, I note that the Juvenile Diabetes Research Foundation, which represents families all over America who are affected with juvenile diabetes, is in support of H.R. 810. I want that on the record. In fact, they have been one of the strongest supporters.

Second, the transplantation of insulin-producing pancreatic cells is already known to reverse the most damaging symptoms of type 1 diabetes. The problem with that is the limited number of organ donors out there who donate pancreases. That seems to be the problem.

Could I ask the Senator, are there enough pancreas donors out there to take care of everyone with juvenile diabetes?

Mr. COBURN. It is not required. Actually, today the science shows that ductal cells from the patient's own pancreas can be induced to become stem cells that then produce insulinproducing cells. There is no transplantation needed. In fact, these ductal cells have been proven and demonstrated to produce the same eyelet cells that the patient did initially when they were grown as an embryo.

Mr. HARKIN. I have heard this argument before. I am not a scientist. I don't know all of the nuances, I would be the first to admit. I do know, however, that every time that has come up, the Juvenile Diabetes Research Association disagrees that this is a viable pathway toward curing all of those with juvenile diabetes.

Mr. COBURN. They cannot disagree. It has only been done for 3 months, and it is successful. There have been no successful embryonic cells taken from the duct of the pancreas of children with diabetes, converted into cells, and have in fact cured their diabetes.

Mr. HARKIN. How many people have been cured of juvenile diabetes with this? Mr. COBURN. For 3 months is all we know. I don't know the numbers. I think it is eight or nine. This protocol is being done in Europe at the present time

Mr. HARKIN. Is it not being done in the United States?

Mr. COBURN. No, it is not being done in the United States.

Mr. HARKIN. Have any of these findings been published?

Mr. COBURN. They have been published in peer-reviewed articles. I would be happy to submit them for the RECORD.

Mr. HARKIN. I would appreciate that.

Mr. COBURN. I thank the Senator for allowing me to ask those questions.

Mr. HARKIN. I thank the Senator. There is a good colloguv.

I would further ask the Senator from Oklahoma—this has been done for 3 months—do we have any data to show that this does cure juvenile diabetes? Does it abate it somewhat? I don't know what the outcomes have been for these eight or nine people.

Mr. COBURN. Here is the key point that needs to be made in this debate: If you use your own cells, you will not have tumors, you will not have teratomas, and you will not have rejection. If you use embryonic stem cells, you will have tumors, you will have teratomas, and you will have rejection.

That is what we know. That is why I, as a scientist, have not raised the life issue here once, but I am adamantly pro-life. I believe the science is so far ahead of this debate. When everyone knows what is really going on in terms of research, they are going to want the dollars put into the stem cells, both in terms of dedifferentiation—we know we can differentiate cells backward to make them pluripotent—and also to isolate cells from our own human body to use back on us. That is an important part of the debate.

Mr. HARKIN. I thank the Senator.

I again say that all the Nobel scientists, all of the leading scientists in America simply do not agree with the Senator from Oklahoma. These are the people involved in cell biology and that kind of research.

The Senator says embryonic stem cells will produce tumors. We do not know that is true. We do not have any real long-term data to know anything about how embryonic stem cells will work later on.

The PRESIDING OFFICER. The time of the Senator has expired.

Under the previous order, the majority is recognized for the next 30 minutes.

Mr. COBURN. I inquire of the Chair, under the previous order, if the majority is not here, who assumes control of the time?

The PRESIDING OFFICER. The time is reserved for the majority to be recognized.

Mr. COBURN. Mr. President, it is my understanding that Senator FRIST has this time. He has advised me I can use the time until he arrives.

The PRESIDING OFFICER. The Senator from Oklahoma.

Mr. COBURN. I will spend a few minutes. This is a very emotional debate for every family in this country. Every family in this country has someone who, in fact, has a disease that will be impacted in the future by research that is ongoing in terms of stem cell research.

I make a couple of points. We have heard today a couple of very strong statements that are highly inaccurate.

One is that the only way you will cure this is with embryonic stem cells. No one knows that. As a matter of fact, most of the cures in science have come not by what we thought was going to happen but by what happened that surprised us. That is not true.

No. 2, there is no ban at the present time on research in this country on embryonic stem cells. What there is a ban on is using additional Federal funds to create additional stem cells, but additional stem cells can be created outside of the Government.

The Senator from South Dakota created a false choice. The false choice is not incineration. There are 400,000 embryos that are frozen in this country today; 93 percent of those the parents want to save for themselves. So that leaves us a smaller portion. If you look at the numbers, when you thaw embryos, you have a 50-percent wastage, you lose 50 percent of them. The false choice Senator Johnson put forward was this: they either get burned up or they get used for embryonic stem cell research. This last week, the 108th baby was born through this Operation Snowflake—which is adopted embryos—so that is not the only choice.

The other thing is, if everyone will recognize, in the fertility community in this country, that in Europe, they do not have a problem with excess embryos. We overdo it in this country in terms of creating embryos for fertility clinics. We create about four times as many obstetrician and fertility specialists as the rest of the world. The choice is not incinerate or use for embryonic stem cell research.

The majority leader has arrived. I yield my time.

The PRESIDING OFFICER. The majority leader.

Mr. FRIST. Mr. President, I thank both of my colleagues for the superb comments thus far over the last 30 minutes but, indeed, since we started at 12:30 today.

As I opened this morning, I made it clear that this debate would be the first of the 21st-century dilemmas that involve ethical considerations and considerations around science, probably the first of many. I say the first; obviously, we have dealt with some other ethical issues in medicine over the last 5 years, but much of the discussion will focus around science and ethics and that nexus, that crossing of those two, and the interplay.

It is important that we debate this and that all concerns are put on the

table, ultimately. These three bills give that opportunity.

Let me add that this probably will be the first of many debates like this in the Senate. I know there are a lot of my colleagues who asked: Why are we bringing this up now? Why are we talking about these tough issues which do force us to address issues about the distinctions of life, the early days of life and also the hope and the promise of science as it goes forward and that interplay? This Senate will have to get used to it.

This Senate will have to focus on those issues as we move forward because science, where it used to be growing at a small clip, is now growing at leaps and bounds, not exponentially but close to exponentially, and will continue to do so.

Less than a century ago, we did not have antibiotics, we did not have vaccines. We had measles, mumps, smallpox, polio—all diseases that ravaged our populations, in this country and around the world. Because of science, because of public health initiatives, they have essentially been eradicated. We will see forward momentum. That momentum will be accelerated in biomedical research.

I mentioned earlier today in opening the debate that when people look back at the 21st century, I would say maybe the next decade is the decade of the cells. Much of our discussion is about developmental biology. That has built upon the foundation of the shoulders of new knowledge regarding molecular and cellular development, coupled with the new understanding that is a product of a sequencing of the human genome from a decade of the last century.

What is important is that the rules, regulations, guidelines, and the framework must be defined and in large part must be defined by this Senate. That is our responsibility as Senators, as representatives of the American people, their attitude, their thought, their philosophies. They are our constituents.

A second point I made when I first started talking about stem cell research 5 years ago is we will have to continually assess and then reassess in light of advancing science certain rules, guidelines, and regulations we put in place. In part, that is why we are here today.

We have three bills before the Senate. My colleagues have talked about those three bills: the Fetus Farming Prohibition the Alternative Act, Pluripotent Stem Cell Therapies Enhancement Act, and the Stem Cell Research Enhancement Act. Each addresses a different facet of the issues raised by advancing research, advancing developmental biology, advancing stem cell research. Each one of them demands thoughtful consideration and deliberation which will play out over the course of today and tomorrow.

I spent my entire professional career as a transplant surgeon, a professional who specializes in moving living tissue from one person to another person—say an organ or a heart. Take out a heart, put in a heart. Take out a lung, put in a lung. Thus, my interest before coming to this Senate focused on many of the same issues that come before the Senate today: advancing science, how do we define "brain death," something we did in the 1960s, to make transplantation of the human heart possible.

Thus, it was a little over 5 years ago—on July 18, 2001—that I laid out a comprehensive proposal, a framework at that time, which I believed would both promote stem cell research but also provide an ethical framework through which such research could be conducted. That was 2001, about 2½ years after embryonic stem cells had just been discovered by James Thomson at the University of Wisconsin, or the human embryonic stem cells.

At that time, 5 years ago, I laid out 10 specific interdependent principles. The principles dealt with all types of stem cell research—the adult stem cells, the germ stem cells, embryonic stem cells. They have helped to guide my assessment of stem cell research over the last 5 years, and they have provided a framework I have used and consistently gone back and adopted as I looked at various pieces of legislation on stem cells before this Senate. I will read those 10 principles because of their inclusiveness and their interdependence:

No. 1, ban embryo creation for research.

No. 2, continue funding the ban on the derivation.

No. 3, ban human cloning.

No. 4, increase adult stem cell research.

No. 5, provide funding for embryonic stem cell research only from blastocysts that would otherwise be discarded.

No. 6, require a rigorous informed-consent process.

No. 7, limit the number of stem cell lines.

No. 8, establish a strong public research oversight system.

No. 9, require ongoing independent scientific and ethical review.

No. 10, strengthen and harmonize fetal tissue research restrictions.

The principles are meant to stand the test of time even when applied to a field as rapidly changing as stem cell research.

Yes, I do believe both embryonic and adult stem cell research should be Federally funded but should only be done so within a carefully regulated, fully transparent, fully accountable framework, ensuring the highest level of respect for that moral significance of the human embryo. But we should fund research when it comes to embryonic stem cell research only if those embryos, only if those stem cell lines were derived from blastocysts that, with 100 percent certainty, are not going to be frozen forever, are not going to be adopted but with 100 percent certainty and with appropriate consent would be discarded, would be thrown away.

Today, we do debate science, developmental biology, and we debate ethics. We are called upon to confront the distinctions around life's early goings when we do so. As my colleagues know, I am pro-life. I do believe human life begins at conception. It is at this moment, at conception, that the organism is complete-immature, yes, but complete. It is genetically distinct, it is biologically human, living. Development is a gradual process, it is a continual process. All of us in this Senate were at one time an embryo. It represents human life at its earliest stage of development. It is a continuum, coming all the way through. That is the science. That is not religion. That is not faith. That is the science. Thus, I believe strongly that an embryo does have moral significance. It needs to be treated with the utmost dignity and respect.

We have three bills before the Senate. The Fetus Farming Prohibition Act of 2006, the implantation and gestation of the human embryo into either a human or an animal for the purpose of aborting for research—that prohibition is what the discussion is about. Clearly, that would fall far short of "utmost dignity and respect."

The bill before the Senate ensures this practice is never employed in human research in the United States. That purposeful development of a human embryo, the manufacturing of human life for experimentation and its ultimate destruction is morally reprehensible. It offends the conscience, degrades the value of human life, and, of course, is not medically necessary. Yet it is a practice that some in the field of developmental biology just might be inclined to pursue if those guidelines, if those regulations, are not out there. Why? To look at the later stages beyond the embryo in terms of development and how cells function, or it might be, as we have heard argued before, that the cells have a different nature after the embryo stage but before delivery of the fetus itself and have more stability or more differentiation. This particular legislation preempts, it stops that possibility.

Not only would this be a flagrant lack of respect for nascent human life, but it would also create powerful incentives for women to undergo an intense regimen of superovulation drugs and surgery with potentially devastating side effects. It could exploit women, the most likely targets of egg harvesting or fetal farming. Under no circumstances could human fetus farming be labeled "medical advancement." It is the exact opposite, an unconscionable regression of the mores that define our culture, a culture that upholds respect for life and health.

As a transplant surgeon, I have had that opportunity to see firsthand how new medical discoveries and technologies can save lives and make life more fulfilling for others. In fact, my entire professional career was spent on these newer therapies, these newer

technologies, in order to give others a better life. But at the same time, whether it is in the laboratory, where I spent a lot of time, or at the bedside, I have been able to also witness how fear can also delay scientific advances that are out there before us

So before us today is that challenge to bridge this divide. And we should reject an outright fear of all technological advance. We have to work together to allow science to advance and to promote those medical advances, whether it is in developmental biology or the human genome project, in order to give a healthier life or more life to others. But we have to do so. That is why we bring these bills to the floor, within an ethical and moral framework, in this pursuit.

Even while we reject a fear of scientific and technological advancement, we still have to—we must; it is our responsibility—live within limits. Limits do not hamper human advances but, rather, allow us to preserve them and to promote them. That is why we can reject this practice of fetus farming while still embracing the hope that is offered by stem cell research. Senators Brownback and Santorum worked hard to bring this important legislation to the floor, and I hope my colleagues will join me in supporting it.

The second bill, the Alternative Pluripotent Stem Cell Therapies Enhancement Act, put forth by Senators SANTORUM and SPECTER, is a very important bill, the purpose of which is to step back from and to remove the ethical considerations that surround the unique potential that these pluripotent stem cells have.

Five years ago, when I came to the floor in 2001, I said the following:

We should not let the potential of this research drive the moral considerations themselves. . . . We do not know what the next great discovery is going to be 6 months from now. . . . So the oversight process has to be responsive, has to be ongoing. It has to recognize that science moves very quickly.

That is why we are here. We recognize that science cannot be practiced in a vacuum. We need to promote and accelerate these medical advances. But we also need to ensure that research practices are channeled along lines that respect human life and dignity.

What seemed impossible even 5 years ago now seems possible. Exciting techniques are beginning to emerge that just may make it unnecessary to have to destroy that embryo, to disaggregate or dismember that embryo, in order to obtain cells that have the pluripotent properties that are either exactly like or very similar to the embryonic stem cells. And we have talked about it a little bit earlier today, and in the past, as to the unique property these embryonic stem cells have, which is this pluripotentiality, which has two concepts to it: No. 1 is that they can become any tissue—theoretically, they can become any tissue—and that is in the differentiation; and, secondly, this overall process of self-renewal, that

they can renew and replicate themselves again and again and again.

An adult stem cell might be reprogrammable. You might be able to directly reprogram that cell to an earlier stage to make it more pliable, to take it back to an earlier or closer to an embryonic phase. Adult stem cells can be what we call multipotential, and that means they can differentiate, and you can back them down to differentiate into certain tissues. The embryonic stem cell is pluripotential, and the range of tissues it can differentiate to are much greater.

But this reprogramming, coming back earlier to the adult stem cell, earlier and earlier along its chronological development, gives the opportunity to send that adult stem cell into various regions; thus, this direct reprogramming concept opens up great potential. To me, and I would hope to every Member of this body, this type of research—research that stops short of having to destroy an embryo—to obtain pluripotent cells through alternative ways should be supported, and I hope can be supported, by everybody in this body.

In May of last year, 2005, the President's Council on Bioethics issued a report bringing these alternative sources attention. At that time, I asked and worked with several of my colleagues to put together a piece of legislation for which we could say Federal funding will go in that direction to derive these alternative means of developing these pluripotential cells. With more Federal support, and with more emphasis, these newer methods may pay off hugely in terms of scientific advantage and clinical advantage.

They may be the way to bridge these moral and ethical differences among people who hold wildly different and broadly different views, which we will actually hear on the floor over the course of today and tomorrow on stem cell research. Why? Because they avoid any destruction of the human embryo. The alternative methods of potentially deriving pluripotent cells, that were spelled out in the Council on Bioethics report of May of last year, include: extraction from embryos that are no longer living; a second proposal was blastomere extraction, which involves a nonlethal and nonharmful extraction of the blastomeres from embryos—and, indeed, several researchers over the course of the last year, since that proposal was initially made, have reported success in that regard—thirdly, extraction from artificially created organisms that are not embryos, but embryolike—this was initially proposed by Bill Hurlbut at Stanford and subsequently demonstrated by Dr. Rudolf Jaenisch and others at MITfourthly, the direct reprogramming of adult or somatic cells to a pluripotent state through fusion with embryonic cell lines.

We are already driving and promoting ethical alternatives such as

adult stem cell research and therapies and cord cell research, both of which have been important to date in the treatment, as well as other types of therapy.

Today, adult stem cell research is the only type of stem cell research that has resulted in proven treatments for human patients. At the Multiorgan Transplant Center that I established and directed at Vanderbilt, we did bone marrow transplants, which are commonly done for treatment of many types of cancers now; at that point, for many types of blood disease. We have had bone marrow transplants done in this country for, oh, about 40 years. The first bone marrow transplant was done in 1968.

Stem cells taken from cord blood have shown great promise in treating the myeloproliferative disorders, the leukemias, congenital immune system disorders.

Recently, cord blood cells have shown some ability to become natural cells, which could lead to treatments for more heart disease and Parkinson's disease. The first cord blood transplant was done about 20 years ago in 1988.

So every day we unlock more of the mysteries of human life, more ways to promote and enhance our health. This compels the profound questions we address, moral questions with which we understandably struggle. Transplantation itself posed a question similar to those we face with stem cell research, a little bit different in that organs were transplanted principally, when I got started, at the end stage of life. People without a heart would be dying 4 to 6 months later. We had to define, as I mentioned earlier, what is brain death. We had ethical considerations about how to allocate a very few number of organs to the many people who waited, which literally meant some people would die waiting for that scarce organ—all ethical considerations

If we can devise a moral and ethical framework, then it is my belief we will have the chance to save many lives and make many countless other lives more fulfilling. That is why it is imperative we get our stem cell policy right scientifically, morally, and ethically.

A lot of diseases have been mentioned on the floor, and I guess over the next 2 days I will have the opportunity to come back and talk about some of those particular diseases. Adult stem cells, we know, are so powerful. They have effectively treated so many diseases today. I mentioned bone marrow transplantation. But the list will be coming to the floor, and they have come to the floor, about the number of therapies with bone marrow transplantation and other adult stem cells. Embryonic stem cells, however, do have this unique capacity of selfreplication, self-renewal over time, and greater potential to differentiate into other types of tissues. Unlike other stem cells, these embryonic stem cells are pluripotent, where adult stem cells tend to be multipotent. That means the embryonic stem cells have the capacity to become a greater range of types of tissues. They are capable of renewing themselves and replicating themselves over and over again indefinitely

A number of people have brought up what the current administration policy is. As we all know, on August 9, 2001, President Bush laid out his principles and put in place a policy, which I supported, that for the first time allowed Federal funding for embryonic stem cell research. The President's policy was consistent with my initial principles—my seventh principle: to limit the number of stem cell lines. In order to accomplish that limiting the number of lines, the President used a date: August 9, 2001.

The President's policy also says: Let's support stem cell lines that have been derived from blastocysts that were going to be thrown away or discarded. His policy is the same in that regard. The cell lines we federally support today all came from blastocysts that were left over by in vitro fertilization that were going to be discarded. The President basically said it was OK to do that before August 9, but after August 9 that will not be allowed anymore, and we will only fund those cell lines

I thought it was very important that Congress continue oversight. Remember, 5 years ago or 6 years ago, I said we are going to be coming back to this again and again and again. I think that oversight absolutely is critical.

This third bill, the Stem Cell Research Enhancement Act, which is the House-passed bill, the Specter-Hatch, the Castle-DeGette bill, is the bill most people will be spending most of their time on over the next day and a half.

Over the last 5 years—while it was widely believed when the President put forth his policy that there would be 78 embryonic stem cell lines available for Federal funding—we have learned, through science, that has not been the case. In fact, of the initial anticipated 78 lines, there are, right now, about 22 lines that are eligible. There is some concern that these lines are becoming less and less stable and less replicative than initially thought.

While we know that this embryonic stem cell research is at a very early stage—remember, these embryonic stem cells were discovered, first, just in 1998; unlike adult stem cells, where we have 40 years of research history—we do know that the embryonic stem cell research is moving fast and moving quickly.

The question is: Are there a sufficient number of cell lines to keep that research going? I believe right now that the current policy unduly restricts the number of cell lines. As I have said, I am going to be supporting and voting for H.R. 810, the Stem Cell Research Enhancement Act. I do not think it is an ideal piece of legislation. It has a few essential shortcomings as

written. It restricts funding to blastocysts left over after IVF that would otherwise be discarded. And that is consistent with my fifth principle. But the shortcomings do have to be addressed somewhere.

First, it lacks a strong ethical and scientific oversight mechanism. Second, the bill does not prohibit financial or other incentives between scientists and fertility clinics. Third, the bill does not specify whether the patients or clinic staff or anyone else has the final say about whether an embryo will be implanted or will be discarded.

And were circumstances different and had the House not acted so quickly and sent the bill over—I think we should have had the opportunity to have a thorough examination and rewrite of that bill. However, even with those reservations, I do support the Stem Cell Research Enhancement Act. As I said, it is completely consistent with my principles from 5 years ago.

Many of my colleagues, such as I, have spent countless hours grappling with this issue—the future of stem cell research. How do we balance pro-life positions with the potential for new life and health offered by stem cell research? There is, perhaps, an inclination to avoid such difficult issues, to ignore them and let others debate. But I believe and feel strongly that we must participate in defining research surrounding the culture of life.

If we don't do that, it will define us. Finally, I thank all of my colleagues. I know we will have a good debate over the next day. We will have those votes at 2:45 tomorrow. I hope those votes will show there are areas of consensus among us and that where differences exist we can respectfully articulate and vote our conscience.

The PRESIDING OFFICER. Under the previous order, the minority is in control of time for the next 30 minutes.

The Senator from Iowa is recognized. Mr. HARKIN. Mr. President, I know that one of the cosponsors of the bill, one of the great leaders in the Senate on stem cell research, has arrived on the floor to speak. I know the Chair will be recognizing her shortly.

I wanted, again, to just take a moment to sort of repeat for emphasis sake what has been said before. I think the distinguished majority leader referred to that also. It is just that here we have an instance where so many leading scientists around, U.S. Nobel Prize winners, and all the disease groups—I submitted a compendium of about 205, and I think that may soar to 500 or 600 by the end of the day—are supporting H.R. 810.

Lest one thinks that, A, either they have all been hoodwinked into thinking this bill is something it is not or, B, that these are malevolent people who want to just destroy embryos without any thought about the morality or the ethics of it, they are simply mistaken. First of all, none of these people have been hoodwinked, and most of these scientists are as ethical

and moral a people as you could find anywhere. They are saying let's use these blastocysts, embryos, or however you want to define them to enhance life, cure disease and illness, rather than having them be discarded, and to do it in a very ethical manner. That is what this bill provides.

With that, I yield the floor.

The PRESIDING OFFICER. The Senator from California is recognized.

Mrs. FEINSTEIN. Mr. President, I rise to support the Stem Cell Research Enhancement Act. Passage of this legislation will finally allow scientists to fully pursue the promise of stem cell research. It will offer hope to millions of our people. Mr. President, we have waited a long time for this day. Earlier, Senator HARKIN spoke to the fact that it was in 1998 when he and Senator SPECTER introduced the first bill dealing with stem cell research. I recall that year I introduced one of the first bills dealing with ethical standards surrounding stem cell research. So it has been 8 years.

Now, finally, the House of Representatives overwhelmingly approved bipartisan legislation. In the intervening time, we have all heard from patients, survivors, and scientists who are desperate to pursue this research that one day could lead to treatments and cures for diabetes, cancer and, yes, even spinal cord injury. Forty Nobel laureates have weighed in with their support, as did former First Lady Nancy Reagan.

While we were waiting, we lost Christopher and Dana Reeve, tireless advocates of stem cell research, and an inspiration for all of us. Millions more American families experienced first-hand the devastation wrought by catastrophic illnesses.

My colleagues and I, Senators SPECTER, HARKIN, KENNEDY, HATCH, and SMITH, worked tirelessly to bring this to a vote. We pushed privately, we wrote letters, we gave speeches, and we held press conferences to highlight the plight of patients who are living with illnesses day in and day out.

Finally, after all of this pleading and delay, the Senate is acting.

I thank my colleagues for their longstanding leadership on this issue, and I am also very grateful to the majority leader, Senator Frist, for his support for stem cell research and his work with his caucus to reach this agreement that has made this debate possible.

For all of the controversy that it is generating, the Castle-DeGette Stem Cell Research Enhancement Act is remarkably simple. It reverses the failed policy announced by President Bush in 2001 when he restricted Federal funding to stem cell lines already in existence.

At the time, the President himself recognized the great promise of stem cell research. He sought to find middle ground, announcing a policy that provided Federal funding for more than 60 preexisting genetically diverse stem cell lines. This was morally acceptable, he said, because the life-or-death deci-

sion for these stem cell lines had already been made.

Unfortunately, the policy did not work out as promised. These available lines are all contaminated with mouse feeder cells and, therefore, are useless for human research purposes. They don't have the diverse genetic makeup that may be necessary to find cures to benefit all Americans. Researchers cannot use them to examine rare and deadly genetic diseases.

Castle-DeGette states that embryos to be discarded from in vitro fertilization clinics may be used in federally funded stem cell research no matter when they were created.

While opponents have suggested that this bill will lead us down a slippery slope, the parameters created by the bill are actually numerous and they are very strict:

The embryos must be left over following fertility treatment.

It must be clear that the embryos will be discarded.

The people donating the embryos must provide written consent.

These donors may not be compensated for their donation.

These restrictions mean that over 400,000 embryos could become available, all while ensuring that researchers meet the highest of ethical standards.

Let us be clear. We are talking about embryos that will be destroyed whether or not this bill becomes law. It is an indisputable fact that these embryos have no future.

We should not confuse the research permitted under this bill with the activities described under the two other bills currently before us. I am going to support these bills. Yet it is important to realize that their passage will do nothing to change the status quo.

The Fetus Farming Prohibition Act bans activities that occur in horror movies, not in our research labs. We should not allow these farfetched and frightening techniques, which no respected scientist anywhere endorses, to distract from the plight of millions of Americans seeking cures from devastating diseases.

This debate is also not about the myriad research approaches envisioned in the Alternative Pluripotent Stem Cell Therapies Enhancement Act, as introduced by my colleagues, Senators SPECTER and SANTORUM. This research can already be funded with Federal dollars. Respected scientists are examining a variety of ways to create these multipurpose cells and, of course, this work should continue.

We simply don't know which research approaches will prove fruitful and which will fail. Alternative techniques may lead eventually to cures for serious afflictions, or they may not. Scientists, not Senators, should determine what research to pursue.

Supporting only the Specter-Santorum alternative is not an endorsement of stem cell research. It is an affirmation of a policy that is leav-

ing American researchers far behind in one of the most important fields of scientific discovery, and I want to spend a moment on that.

Because of President Bush's restrictions, some of our best and brightest scientists are leaving the United States to work overseas in countries that have embraced the promise of comprehensive stem cell research. This brain drain has hit my State particularly hard. Let me give you a few examples.

Roger Peterson, a renowned scientist, left the University of California Medical Center in San Francisco in 2001, citing the unfriendly research climate in the United States. He is now conducting human stem cell research at Cambridge University in the United Kingdom. He and his UK team are exploring the biology behind pluripotent, or multipurpose stem cells, and are looking for ways to use them for treatment. He would not have had Federal funding to do this work in the United States, so he left.

Dr. Judith Swain, from the University of California San Diego, will leave for Singapore in September, where she will work at Singapore's state-funded research institute called Biopolis. Her husband, Dr. Edward Holmes, also of the University of California at San Diego, is a ranking official in California's stem cell agency. He is also leaving for Singapore.

NIH researchers, Neal Copeland and Nancy Jenkins, turned down offers to join Stanford University's stem cell department. They, too, are moving to Singapore. Copeland has said that he selected Singapore because of its "unfettered support of human embryonic stem cell research."

These are but a few examples of the costs of this President's policy.

Researchers are attracted by the federal funding provided in at least 10 other nations—Germany, Finland, France, Sweden, United Kingdom, South Korea, Singapore, Israel, China, and Australia. These investments total hundreds of millions of dollars that are already producing tangible progress.

Sweden funds, with federal funds, 400 researchers today. South Korea and China are each funding an additional 300. Australia has pledged \$90 million through 2011. This investment has already paid off, as Australian researchers have discovered a way to manipulate stem cells into lung cells. This technology could one day be used to treat cystic fibrosis.

Scientists from around the world have come to Singapore's Institute of Bioengineering and Nanotechnology. There, they are using stem cells to produce artificial kidneys. This could one day free people from the burden of kidney dialysis.

Researchers in other countries now author an increasing proportion of stem cell papers than those in the United States.

Foreign researchers have derived almost three-quarters of the world's new

stem cell lines, moving quickly ahead of our country, the United States.

Other nations have the money, the researchers, the facilities, and the new stem cell lines they need to move forward. They are learning more about stem cells every day and laying the foundation for groundbreaking cures.

American scientists, on the other hand, cannot obtain Federal funding to do this work. These Federal funding restrictions have a real world impact on ongoing research.

American scientists are making great strides with work on mouse stem cells. They are showing what could be possible if there is Federal funding to extend this work into humans.

Researchers at Stanford University have recently turned cells derived from mouse embryos into one of the building blocks of blood vessels. This advance means they may eventually be able to grow entirely new blood vessels, offering great promise to patients suffering from heart disease. But without Federal funds, it is unlikely they can get the stem cell lines to be able to do the human research.

A research team at Johns Hopkins used cells from mouse embryos to regenerate nerves in paralyzed rats. After treatment, many of the rats regained enough strength to walk and bear weight on their previously paralyzed hind legs.

Mr. President, do you know what this means? This means it might—just might—be possible to do something science said could never be done, and that is to regenerate a severed spinal column, to regenerate the nerves which scientists always thought never again could be regenerated.

We would never have thought discoveries such as this were possible even a few years ago. So think of what it means for every paraplegic or quadriplegic to know that there is hope out there, that the first rat tests have shown it works?

The next step is the human stem cell lines, to be able to carry out that research on humans, and that is exactly what we are talking about today.

Scientists now must work to translate these promising advances into cures for humans. Such a feat will almost certainly require access to viable lines of human stem cells, and unless we pass Castle-DeGette and unless the President signs Castle-DeGette, these lines will not be available in the United States to regenerate a severed spinal column, to regenerate blood vessels, or to do anything else.

Mike Armstrong, an old friend and chairman of the Johns Hopkins board of trustees, made this very point in a letter he wrote stating news of this advance. Here is what he said:

Treatments not only for paralysis, but for ALS, for multiple sclerosis, and similar diseases of the brain now seem possible. The exact timeframe is impossible to predict, but it will almost certainly depend on the availability of Federal funding.

It will depend on the availability of Federal funding, and that is what is at stake in this debate. He goes on to say: The level of funding that will ultimately be required to advance this field of science to human trials, however, suggests that Federal funding will be necessary. Yet, under current Federal policy, the only stem cell lines eligible for Federal funding were created using mouse feeder cells and could never be used in clinical trials with humans.

Could never be used in clinical trials for humans.

I am particularly proud of the commitment demonstrated by California scientists and activists in the face of these restrictions. In 2004, California voters approved a proposition, proposition 71. That proposition created and funded the California Institute of Regenerative Medicine. It funded it with \$3 billion of taxpayers' dollars over 10 years, and it supported promising research conducted in my State. This work will be done with careful ethical oversight. It also bans human reproductive cloning, something we all agree is immoral and unethical.

This investment, hopefully, once it gets past the court tests, will make California a leader in this industry and in finding cures that will change the lives of suffering patients.

Other States are making similar investments. Connecticut, Illinois, New Jersey, Maryland, and others are considering after 5 years of delay because of the restriction on Federal funding—they are taking steps to move this important work forward on a State basis. But—and here is the but—a patchwork, State-by-State approach is no way to run science policy. States have many other responsibilities, such as funding education, building infrastructure, and so on, and we shouldn't expect them to solely carry the burden of funding one of the most promising fields of science.

There is a reason we invest so much in the National Institutes of Health and the biomedical research they conduct. The NIH can then set national standards and ensure that research is not being duplicated and to see that it is carried out under ethical standards. This is something everyone should want. You should want that Federal oversight of NIH over all research funding that is funded with Federal dollars.

It is also important to remember that this debate is about real people whose lives are impacted by illness every single day, day in, day out. I have heard from so many Californians who have been personally impacted by diseases that could one day be cured with stem cell research. I want to tell a few of those stories.

Leslie Bishop Franco from Oakland, CA, wrote to me to say she supports stem cell research because her mother was diagnosed with Alzheimer's at the age of 57. Her mother quickly became unable to work and then unable to care for herself. Leslie and her sisters and brothers cared not only for their own young children but also for their mother. This is something many families know all too well.

Leslie writes that even if stem cell research does not "lead to a cure for Alzheimer's as it has the potential in

other diseases like Parkinson's and diabetes, it will provide crucial insights into the disease and the usefulness of new drugs."

Mark Siegel from Los Angeles has suffered from Parkinson's for 8 years. For over half the time he has been ill, the President's policies have slowed stem cell research. Mark was diagnosed when he was 36 years old. One of my sons-in-law was just diagnosed, and he is 44 years old.

What happens is Parkinson's slowly erodes one's motor control. Mark Siegel's condition had forced him to change jobs, and he is afraid we are losing the race against time to find a cure and save his life.

Jennifer Heumann from Huntington Beach, CA, has been living with juvenile diabetes since she was 2 years old, and she is now 16. She says diabetes hasn't stopped her from playing varsity tennis or going to high school dances, but she knows her disease can cause serious complications. Without a cure, she has a 65-percent chance of dying from heart disease or stroke and a 60-percent chance of developing nervous system damage.

Jennifer writes:

These are the cold, hard facts, but I am not content to admit they are my destiny. I believe that a cure is in sight, and that embryonic stem cell research may be the key to finding this cure. If this is the case, how can we justify passing up this opportunity?

We all should ask that question. This impressive young woman is hard to argue with. She makes a very eloquent point, and until we know what kinds of research could lead to cures for these catastrophic diseases, we should support scientists and we should push ahead every possible lead.

These patients and family members represent only a few of the tens of thousands of Californians I have heard from who support stem cell research. As a matter of fact, by the latest poll, 72 percent of Americans support stem cell research.

We don't want to spread false hope. There is still much we don't understand about stem cells. Some of the cures may never come to fruition, but unless we allow our scientists to continue their work, we will never, ever know. How can any of us tell a patient suffering from juvenile diabetes, a cancer victim, or a young man with heart disease, that the Senate decided not to allow researchers to pursue all the scientific leads that may one day offer them a cure? How can we say that? How can we say we know better? How can we say because of a small proportion of people's beliefs we are going to stop all Federal research in the United States of America?

Last week, Karl Rove declared that the President is emphatic about vetoing this legislation. I hope not. The President himself acknowledged the great promise of stem cells back in 2001, and with the health of millions of Americans at stake, it is my hope that if and when this bill tomorrow afternoon passes the Senate and if and when

it goes to the President of the United States, he will reconsider his veto threat. Too many lives depend upon the advances which may well be possible.

Either you are for stem cell research or you are not. It is that simple. True support for stem cells means lifting the restrictions from hampering some of the most promising research, and only Castle-DeGette, only H.R. 810 will do that. No matter what the President decides on other legislation we are considering today, rejecting H.R. 810 is a rejection of science. It is a rejection of the hopes of millions of patients. This vote and the President's reaction to it should not be about assuaging a small but vocal minority with views far from the mainstream of 72 percent of the American people. Patients and their families deserve more than the President's first veto. How would you like it if you were President of the United States and the first veto of your political career were a veto of the one thing that offers hope for millions of Americans suffering from catastrophic disease? The one thing out there.

I want to assure these patients that my colleagues and I will not stop fighting for this. We will continue to push in every way possible. Patients suffering from these catastrophic illnesses have already waited too long. American scientists have already fallen behind their international counterparts, and the time has come to finally pass Castle-DeGette on a sweeping bipartisan basis, just as the House of Representatives did 13 months ago.

Thank you very much. I yield the

The PRESIDING OFFICER. Under the previous order, the next 30 minutes will be controlled by the majority.

Mr. COBURN. Mr. President, Senator BROWNBACK has graciously allowed me to take 10 minutes of his time. I would like to do that at this time.

First of all, I would like to set the record straight: the United States remains the world's leader of published stem cell articles and human embryonic stem cell articles. Specifically, it was April 6 of this year when that statement was made. From 1998 through the end of 2005, the United States published 46 percent of all papers published worldwide—by far the single largest proportion. The remaining 54 percent was divided among 17 other countries.

Mr. President, I ask unanimous consent to have printed in the RECORD the latest peer review articles that have been brought up to date for this year. This is about 15 pages long, and it has multiple entries. For every disease that has been mentioned on the Senate floor by those supporting the embryonic stem cell research, there are treatments ongoing today using adult stem cells.

The PRESIDING OFFICER. Without objection, it is so ordered.

(See exhibit 1.)

Mr. COBURN. Mr. President, the other thing I think we ought to make

sure of-and I just want to go back. The Senator from California claims 72 percent of Americans favor stem cell research. That is true. That is true, if you ask it that way. But if you ask it: Should your tax dollars be used to destroy embryos to then create a research mechanism, it falls to 38 percent. So there is a difference between the ethical dilemma. I understand people can honorably disagree on the ethical dilemma, but we ought to be truthful about what the polling actually says. If you specifically say what we are doing, you get a much different answer.

I want to talk for a minute about something the majority leader discussed. He is a transplant surgeon. There are two problems transplant surgeons face. One is enough organs, which is a difficult problem in our country today, but the second problem is rejection. Nobody is talking about the long-term consequences of where we go.

Let's assume everything that everyone says about embryonic stem cell research is right. I am highly skeptical of that, but let's assume that it is. You still have this little problem called histocompatibility; in other words, rejection. Whatever you do with it, you are going to have a problem with rejection. And the thing that is so exciting about germ cell—and I want to explain that for a minute. Germ cells—pluripotent stem cells—just as powerful as embryonic, they can do everything that embryonic can. They don't have that problem. No. 1, they are pluripotent: No. 2. they continue to reproduce pluripotent cells just like embryonic. That is new research. That is 6 months old. It was discovered here first. It was duplicated in Germany last month. So that is a brand new study.

The point is, you don't have rejection because you are taking your own cells to create a pluripotent cell, and that is the wonderful thing about adult stem cells, about cord blood stem cells, about germ cells, is that they create a pluripotent cell. There is no rejection. So when you hear all the talk about embryonic stem cell research, the thing to remember is when you get the treatment, you are going to have the side effects like everybody else who has the transplant—if it works—and that is immune-suppressive drugs. You are going to have to have them. The only way not to have that is to do fetal farming or human cloning, where you clone yourself and then take part of what you have cloned back, which we already know is illegal and is banned. So it is important for the debate to focus on that.

Everybody in this country wants cures. Everybody wants to do the thing that will get us there the fastest with the least complications, and we want to invest our dollars in what will be most successful.

One of the things my dad taught me is to look around the world, and if you want to see what is happening, follow

the money. If you look around the world today, the world as a whole, and you look at where the money is being spent, it is not being spent on embryonic stem cells. It is being spent on stem cells from us, just like we had the debate a moment ago. We now know ductal cells from somebody's pancreas can create new insulin-producing cells. We know now the mucosa, the lining of your mouth, can create cells to make you a new cornea. You don't have to have a cornea transplant in the future because your own cells are going to be able to create a new cornea. We also know that we have stem cells in our body that can take away cystoid macular edema, this aging process where we as seniors start to lose our vision—the cloudiness—the macular area of the retina starts to fall away. All of these wonderful things that we are doing versus nothing that has been accomplished.

I also would refer to the reference of the Senator from California to the renal success. It wasn't done with an embryonic stem cell, it was done with an adult stem cell. That research was all adult stem cells. So we end up tending to confuse what has really happened.

The fact is, all the success in treatment, all the success in terms of who is willing to invest private capital, where they are putting it, they are not putting it in embryonic. There is a reason for it. It is because in the long term it won't be the best treatment. It is fun science. As a doctor, I will tell you there could be no more fun or rewarding or interesting science than embryonic stem cell because you can turn things on and turn things off. There is no question about it. But what we are finding out is you can actually do that with our own cells, our own stem cells.

This idea of de-differentiation—and I want to explain that for a minute because we are going to hear a lot about it in the next 10 years—we take one of your stem cells, one of your multipotent—not totipotent, not pluri potent, but multi—and reverse its mechanism where we make it pluripotent. We are doing that in several stem cells now with an enzyme called reversa, where they are reversing the cell structure and making it revert back to what it was; in other words, grow in reverse to become pluripotent.

So I hope everybody will remember, this isn't a choice about cures or no cures. We are getting cures like crazy right now with adult stem cells and cord blood. We are going to be doing tons more when this germ cell comes forward. There is no question the scientific community is extremely excited about germ cell pluripotent stem cells because it has all the potential that an embryonic stem cell has and none of the problems.

With that, I yield back my remaining time, and I thank the Senator from Kansas.

#### EXHIBIT 1

PEER-REVIEWED REFERENCES SHOWING APPLICATIONS OF ADULT STEM CELLS THAT PRODUCE THERAPEUTIC BENEFIT OR HUMAN PATIENTS (NOT A COMPLETE LISTING, SAMPLE REFERENCES)

ADULT STEM CELLS—HEMATOPOIETIC REPLACEMENT

CANCERS

Brain tumors—medulloblastoma and glioma

Dunkel, IJ; "High-dose chemotherapy with autologous stem cell rescue for malignant brain tumors"; Cancer Invest. 18, 492–493; 2000

Abrey, LE et al.; "High dose chemotherapy with autologous stem cell rescue in adults with malignant primary brain tumors"; J. Neurooncol. 44, 147–153; Sept. 1999

Finlay, JL; "The role of high-dose chemotherapy and stem cell rescue in the treatment of malignant brain tumors: a reappraisal"; Pediatr. Transplant 3 Suppl. 1, 87-95; 1999

Retinoblastoma

Hertzberg H et al.; "Recurrent disseminated retinoblastoma in a 7-year-old girl treated successfully by high-dose chemotherapy and CD34-selected autologous peripheral blood stem cell transplantation"; Bone Marrow Transplant 27(6), 653-655; March 2001

Dunkel IJ et al.; "Successful treatment of metastatic retinoblastoma"; Cancer 89, 2117–2121; Nov. 15, 2000

Ovarian cancer

Stiff PJ et al.; "High-dose chemotherapy and autologous stem-cell transplantation for ovarian cancer: An autologous blood and marrow transplant registry report"; Ann. Intern. Med. 133, 504-515; Oct. 3, 2000

Schilder, RJ and Shea, TC; "Multiple cycles of high-dose chemotherapy for ovarian cancer"; Semin. Oncol. 25, 349–355; June 1998 Merkel cell carcinoma

Waldmann V et al.; "Transient complete remission of metastasized merkel cell carcinoma by high-dose polychemotherapy and autologous peripheral blood stem cell transplantation"; Br. J. Dermatol. 143, 837-839; Oct. 2000

Testicular cancer

Bhatia S et al.; "High-dose chemotherapy as initial salvage chemotherapy in patients with relapsed testicular cancer"; J. Clin. Oncol. 18, 3346–3351; Oct. 19, 2000

Lymphoma

Tabata M et al.; "Peripheral blood stem cell transplantation in patients over 65 years old with malignant lymphoma—possibility of early completion of chemotherapy and improvement of performance status"; Intern Med 40, 471–474; June 2001

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Josting, A; "Treatment of Primary Progressive Hodgkin's and Aggressive Non-Hodgkin's Lymphoma: Is There a Chance for Cure?": J Clin Oncol 18, 332–339; 2000

Koizumi M et al.; "Successful treatment of intravascular malignant lymphomatosis with high-dose chemotherapy and autologous peripheral blood stem cell transplantation"; Bone Marrow Transplant 27, 1101–1103; May 2001

Non-hodakin's lumphoma

Buadi FK et al., Autologous hematopoietic stem cell transplantation for older patients with relapsed non-Hodgkin's lymphoma, Bone Marrow Transplant 37, 1017–1022, June 2006

Tabata M et al.; "Peripheral blood stem cell transplantation in patients over 65 years old with malignant lymphoma—possibility of early completion of chemotherapy and improvement of performance status"; Intern Med 40, 471-474; June 2001

Josting, A; "Treatment of Primary Progressive Hodgkin's and Aggressive Non-Hodgkin's Lymphoma: Is There a Chance for Cure?"; J Clin Oncol 18, 332–339; 2000

Kirita T et al.; "Primary non-Hodgkin's lymphoma of the mandible treated with radiotherapy, chemotherapy, and autologous peripheral blood stem cell transplantation"; Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 90, 450–455; Oct. 2000

Hodgkin's lymphoma

Peggs KS et al., "Clinical evidence of a graft-versus-Hodgkin's-lymphoma effect after reduced-intensity allogeneic transplantion", Lancet 365, 193–1941, 4 June 2005

Josting, A; "Treatment of Primary Progressive Hodgkin's and Aggressive Non-Hodgkin's Lymphoma: Is There a Chance for Cure?"; J Clin Oncol 18, 332–339; 2000

Acute lymphoblastic leukemia

Laughlin MJ et al.; "Hematopoietic engraftment and survival in adult recipients of umbilical-cord blood from unrelated donors", New England Journal of Medicine 344, 1815–1822: June 14, 2001

Ohnuma K et al.; "Cord blood transplantation from HLA-mismatched unrelated donors as a treatment for children with haematological malignancies"; Br J Haematol 112(4), 981–987; March 2001

Marco F et al.; "High Survival Rate in Infant Acute Leukemia Treated With Early High-Dose Chemotherapy and Stem-Cell Support"; J Clin Oncol 18, 3256–3261; Sept. 15 2000

Acute myelogenous leukemia

Laughlin MJ et al.; "Hematopoietic engraftment and survival in adult recipients of umbilical-cord blood from unrelated donors", New England Journal of Medicine 344, 1815–1822: June 14, 2001

1815–1822; June 14, 2001 Ohnuma K et al.; "Cord blood transplantation from HLA-mismatched unrelated donors as a treatment for children with haematological malignancies"; Br J Haematol 112(4), 981–987; March 2001

Gorin NC et al.; "Feasibility and recent improvement of autologous stem cell transplantation for acute myelocytic leukaemia in patients over 60 years of age: importance of the source of stem cells"; Br. J. Haematol. 110, 887-893; Sept 2000

Bruserud O et al.; "New strategies in the treatment of acute myelogenous leukemia: mobilization and transplantation of autologous peripheral blood stem cells in adult patients"; Stem Cells 18, 343–351; 2000

 $Chronic\ myelogenous\ leukemia$ 

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Ohnuma K et al.; "Cord blood transplantation from HLA-mismatched unrelated donors as a treatment for children with haematological malignancies"; Br J Haematol 112(4), 981-987; March 2001

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Ohnuma K et al.; "Cord blood transplantation from HLA-mismatched unrelated donors as a treatment for children with haematological malignancies"; Br J Haematol 112(4), 981–987; March 2001

 $Chronic\ myelomonocytic\ leukemia$ 

Elliott MA et al., Allogeneic stem cell transplantation and donor lymphocyte infusions for chronic myelomonocytic leukemia, Bone Marrow Transplantation 37, 1003–1008, 2006

Angioimmunoblastic lymphadenopaihy with dusproteinemia

Lindahl J et al.; "High-dose chemotherapy and APSCT as a potential cure for relapsing

hemolysing AILD''; Leuk Res 25(3), 267–270; March 2001

Multiple myeloma

Aviles A et at., Biological modifiers as cytoreductive therapy before stem cell transplant in previously untreated patients with multiple myeloma, Annals of Oncology 16, 219–221, 2005

Vesole, DH et al.; "High-Dose Melphalan With Autotransplantation for Refractory Multiple Myeloma: Results of a Southwest Oncology Group Phase II Trial"; J Clin Oncol 17, 2173–2179; July 1999.

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Ohnuma K et al.; "Cord blood transplantation from HLA-mismatched unrelated donors as a treatment for children with haematological malignancies"; Br J Haematol 112(4), 981-987; March 2001

Bensinger WI et at.; "Transplantation of bone marrow as compared with peripheralblood cells from HLA-identical relatives in patients with hematologic cancers"; New England Journal of Medicine 344, 175–181; Jan 18 2001

Breast cancer

Damon LE et al.; "High-dose chemotherapy and hematopoietic stem cell rescue for breast cancer: experience in California"; Biol. Blood Marrow Transplant 6, 496-505; 2000

Paquette, RL et al., "Ex vivo expanded unselected peripheral blood: progenitor cells reduce post-transplantation neutropenia, thrombocytopenia, and anemia in patients with breast cancer", Blood 96, 2385–2390; October. 2000.

Stiff P et al.; "Autologous transplantation of ex vivo expanded bone marrow cells grown from small aliquots after high-dose chemotherapy for breast cancer"; Blood 95, 2169–2174; March 15, 2000

Koc, ON et al.; "Rapid Hematopoietic Recovery After Coinfusion of Autologous-Blood Stem Cells and Culture-Expanded Marrow Mesenchymal Stem Cells in Advanced Breast Cancer Patients Receiving High-Dose Chemotherapy"; J Clin Oncol 18, 307–316; January 2000

Neuroblastoma

Kawa, K et al.; "Long-Term Survivors of Advance Neuroblastoma With MYCN Amplification: A Report of 19 Patients Surviving Disease-Free for More Than 66 Months"; J Clin Oncol 17:3216–3220; October 1999

Renal cell carcinoma

Barkholt L et at., Allogeneic haematopoietic stem cell transplantation for metastatic renal carcinoma in Europe, Annals of Oncology published online 28 April 2006

Arya M et al., Allogeneic hematopoietic stem-cell transplantation: the next generation of therapy for metastatic renal cell cancer, Nat Clin Pract Oncol. 1, 32–38, Nov 2004

Childs R et al., "Regression of Metastatic Renal-Cell Carcinoma after Nonmyeloablative Allogeneic Peripheral-Blood Stem-Cell Transplantation", New England Journal of Medicine 343, 750–758; Sept. 14, 2000

Childs, RW; "Successful Treatment of Metastatic Renal Cell Carcinoma With a Nonmyeloablative Allogeneic Peripheral-Blood Progenitor-Cell Transplant: Evidence for a Graft-Versus-Tumor Effect; J Clin Oncol 17, 2044–2049; July 1999

Soft tissue sarcoma

Blay JY et al.; "High-dose chemotherapy with autoogous hematopoietic stem-cell transplantation for advanced soft tissue sarcoma in adults"; J. Chin. Oncol. 18, 3643–3650; Nov 1 2000

Ewing's sarcoma

Drabko K et al., Megachemotherapy followed by autologous stem cell transplantation in children with Ewing's sarcoma, Pediatric Transplantation 9, 618-621, 2005

Various solid tumors

Pedrazolli P et al., High dose chemotherapy with autologous hematopoietic stem cell support for solid tumors other than breast cancer in adults, Annals of Oncology published online 17 March 2006

Nieboer P et al.; "Long-term haematological recovery following high-dose chemotherapy with autologous bone marrow transplantation or peripheral stem cell transplantation in patients with solid tumours"; Bone Marrow Transplant 27, 959–966; May 2001

Lafay-Cousin L et al.; "High-dose thiotepa and hematopoietic stem cell transplantation in pediatric malignant mesenchymal tumors: a phase II study"; Bone Marrow Transplant 26, 627–632; Sept. 2000

Michon, J and Schleiermacher, G. "Autologous haematopoietic stem cell transplantation for paediatric solid tumors", Baillieres Best Practice Research in Clinical Haematology 12, 247–259, March-June, 1999.

Schilder, RJ et al.; "Phase I trial of multiple cycles of high-dose chemotherapy supported by autologous peripheral-blood stem cells"; J. Clin. Oncol 17, 2198–2207; July 1999

Waldenstrom's macroglobulinemia

Anagnostopoulos A et al.; "High-dose chemotherapy followed by stem cell transplantation in patients with resistant Waldenstrom's macroglobulinemi"; Bone Marrow Transplant 27, 1027–1029; May 2001

 $Hemophagocytic\ lymphohistiocytosis$ 

Matthes-Martin S et al.; "Successful stem cell transplantation following orthotopic liver transplantation from the same haploidentical family donor a girl with hemophagocytic lymphohistiocytosis"; Blood 96, 3997–3999; Dec 1, 2000

Poems syndrome (osteosclerotic myeloma)

Dispenzieri A et al., Peripheral blood stem cell transplantation in 16 patients with POEMS syndrome, and a review of the literature, Blood 104, 3400-3407, 15 November 2004

Myelo fibrosis

Cometta K et al., Umbilical cord blood transplantation in adults: results of the prospective Cord Blood Transplantation (COBLT), Biol Blood Marrow Transplant 11, 149–160, February 2005

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Kroger N et al., Pilot study of reduced-intensity conditioning followed by allogeneic stem cell transplantation from related and unrelated donors in patients with myelofibrosis, Br J Haematol 128, 690–697, March 2005

Thiele J et al., Dynamics of bone marrow changes in patients with chronic idiopathic myelofibrosis following allogeneic stem cell transplantation, Histol Histopathol 20, 87–89, July 2005

Rondelli D et al., Allogeneic hematopoietic stem-cell transplantation with reduced-intensity conditioning in intermediate- or high-risk patients with myelofibrosis with myeloid metaplasia, Blood 105, 4115–4119, 15 May 2005

Benesova P et al., [Complete regression of bone marrow fibrosis following allogeneic peripheral blood stem cell transplantation in a patient with idopathic myelofibrosis] [Article in Czech], Cesk Patol 40, 167–171, October

ADULT STEM CELLS—IMMUNE SYSTEM REPLACEMENT

AUTOIMMUNE DISEASES

Systemic lupus

Burt RK et al., Nonmyeloablative hematopoietic stem cell transplantation for systemic lupus erythematosus, Journal of the American Medical Association 295, 527– 535, February 1, 2006

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Wulfffraat, NM et al.; "Prolonged remission without treatment after autologous stem cell transplantation for refractory childhood systemic lupus erythematosus"; Arthritis Rheum 44(3), 728–731; March 2001

Rosen, O et al.; "Autologous stem-cell transplantation in refractory autoimmune diseases after in vivo immunoablation and ex vivo depletion of mononuclear cells"; Arthritis res. 2, 327–336; 2000

Traynor, AE et al.; "Treatment of severe systemic lupus erythematosus with high-dose chemotherapy and haemopoietic stemcell transplantation: a phase I study"; Lancet 356, 701-707; August 26, 2000

Burt, RK and Traynor, AE; "Hematopoietic Stem Cell Transplantation: A New Therapy for Autoimmune Disease"; Stem Cells 17, 366–372; 1999

Burt, RK et al.; "Hematopoietic stem cell transplantation of multiple sclerosis, rheumatoid arthritis, and systemic lupus erythematosus"; Cancer Treat. Res. 101, 157–184: 1999

Traynor, A and Burt, RK; "Haematopoietic stem cell transplantation for active systemic lupus erythematosus"; Rheumatology 38, 767-772; August 1999

Martini, A et al.; "Marked and sustained improvement 2 years after autologous stem cell transplant in a girl with system sclerosis"; Rheumatology 38, 773; August 1999 Sjogren's syndrome

Rabusin, M et al.; "Immunoablation followed by autologous hematopoietic stem cell infusion for the treatment of severe autoimmune disease"; Haematologica 85(11 Suppl), 81–85; Nov. 2000

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Autoimmune cytopenia

Passweg, JR et al., Haematopoietic stem cell transplantation for refractory autoimmune cytopenia, British Journal of Haematology 125, 749–755, June 2004

Rabusin M et al.; "Immunoablation followed by autologous hematopoietic stem cell infusion for the treatment of severe autoimmune disease"; Haematologica 85(11 Suppl), 81–85; Nov. 2000

Scleromyxedema

A.M. Feasel et al., "Complete remission of scleromyxedema following autologous stem cell transplantation," Archives of Dermatology 137, 1071–1072; Aug. 2001

Scleroderma

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Burt, RK and Traynor, AE; "Hematopoietic Stem Cell Transplantation: A New Therapy for Autoimmune Disease"; Stem Cells 17, 366–372; 1999

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Hawkey, CJ et al.; "Stem cell transplantation for inflammatory bowel disease: practical and ethical issues"; Gut 46, 869-872; June 2000

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Rabusin, M et al.; "Immunoablation followed by autologous hematopoietic stem cell infusion for the treatment of severe autoimmune disease"; Haematologica 85(11 Suppl), 81–85; Nov. 2000

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Burt, RK et al., "Induction of remission of severe and refractory rheumatoid arthritis by allogeneic mixed chimerism", Arthritis & Rheumatism 50, 2466–2470, August 2004

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Burt, RK et al., "Autologous hematopoietic stem cell transplantation in refractory rheumatoid arthritis: sustained response in two of four patients", Arthritis & Rheumatology 42, 2281–2285, November 1999 Juvenile arthritis

I M de Kleer et al., Autologous stem cell transplantation for refractory juvenile idiopathic arthritis: analysis of clinical effects, mortality, and transplant related morbidity, Ann Rheum Dis 63, 1318–1326, 2004 Rabusin, M et al.; "Immunoablation fol-

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Saccardi, R et al., Autologous HSCT for severe progressive multiple sclerosis in a multicenter trial: impact on disease activity and quality of life, Blood 105, 2601–2607, 15 March 2005

Burt, RK et al., "Induction of tolerance in autoimmune diseases by hematopoietic stem cell transplantation: getting closer to a cure?", Blood 99, 768-784, 1 February 2002

Mancardi, GL et al.; "Autologous hematopoietic stem cell transplantation suppresses Gd-enhanced MRI activity in MS"; Neurology 57, 62–68; July 10, 2001

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Burt RK et al.; "Hematopoietic stem cell transplantation of multiple sclerosis, rheumatoid arthritis, and systemic lupus erythematosus"; Cancer Trat. Res. 101, 157–184: 1999

Polychondritis

Rosen O et al.; "Autologous stem-cell transplantation in refractory autoimmune diseases after in vivo immunoablation and ex vivo depletion of mononuclear cells"; Arthritis res. 2, 327–336; 2000

Systemic vasculitis

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Buerger's disease

Kim D-I et al., Angiogenesis facilitated by autologbus whole bone marrow stem cell transplantation for Buerger's disease, Stem Cells 24, 1194–1200, 2006

### IMMUNODEFICIENCIES

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Cavazzana-Calvo M et al.; "Gene therapy of human severe combined immunodeficiency (SCID)-XI disease"; Science 288, 669-672; April 28, 2000 (NOTE: gene therapy using bone marrow adult stem cells as gene vehicle)

X-linked lymphoproliferative syndrome and X-linked hyperimmunoglobulin M syndrome

Banked unrelated umbilical cord blood was used to reconstitute the immune system in 2 brothers with X-linked lymphoproliferative syndrome and 1 boy with X-linked hyperimmunoglobulin-M syndrome. Two years after transplantation, all 3 patients have normal immune systems. These reports support the wider use of banked partially matched cord blood for transplantation in primary immunodeficiencies.

Reference: Ziegner UH et al.; "Unrelated umbilical cord stem cell transplantation for X-linked immunodeficiencies"; J Pediatr 138(4), 570-573; April 2001

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Reference: Amrolia, P. et al., "Nonmyeloablative stem cell transplantation for congenital immunodeficiencies", Blood 96, 1239–1246, Aug. 15, 2000.

ANEMIAS AND OTHER BLOOD CONDITIONS Sickle cell anemia

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Adamkiewicz TV et al., Transplantation of unrelated placental blood cells in children with high-risk sickle cell disease, Bone Marrow Transplant. 34, 405–411, Sept 2004

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ADULT STEM CELLS—REPAIR/REPLACMENT OF SOLID TISSUES

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### BLADDER DISEASE

End-stage bladder disease

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Mr. BROWNBACK. Mr. President, I want to thank my colleague from Oklahoma. He is learned. He has spent the time to study these issues as a doctor. He has worked on these issues and he cares a great deal about them, and I appreciate his time and his focus on this issue.

I want to discuss a few additional things in response to the comments that have been made thus far. I want to get back to what we are talking about. We are talking about destroying young human life for research purposes. I will show a picture of that so people will get the idea—and I know people do—but it is important to remember we all started out looking like this. Even the Presiding Officer, as handsome as he is, looked like this at one point in time. Just a clump of cells—that was him.

This is a particular young person by the name of Hannah with whom I just met a few hours ago. This is when she was adopted as a frozen embryo, and this shows her development taking place. If you destroy her here, we don't get her here. That is the key. She was called a snowflake: an adopted frozen embryo.

I hope some people who are maybe watching or hear about this, if they have frozen human embryos, they consider putting them up for adoption because a number of people want to adopt them.

A couple of people adopted Hannah. They had fertility problems themselves, could not conceive. They used IVF, and so adopted her as a snowflake, as a frozen embryo. She was implanted, and now we have Hannah. Hannah is quite—I guess you would say out of the mouths of babes, children, comes great wisdom.

This is a chart she did last year when she was in Washington. When the House was considering legislation—this same legislation—she did this chart, this letter that kids write, my kids write—I love them. She said—this is

Hannah—snowflake: We're kids, I love you. Then she draws three pictures here below. This is her smiling because she got adopted, and she is here. Here is another frozen embryo—these are embryos—that is sad because he is still sitting in a frozen state, and then here is one that, as she explains, is saying: What, are you going to kill me? This was her explanation to her mother who just gave this chart to me.

I hope people really would think about that. This is not just a clump of tissue. This is not just a group of a few cells. This is not a hair follicle. This is not a fingernail. This is Hannah. And, if nurtured, she grows to be just this beautiful child. We have a lot of them, frozen embryos, and I hope people will consider putting them up for adoption because there are a lot of people who want to adopt them.

My colleagues talked about cures. I

My colleagues talked about cures. I want cures. I have talked a lot about cures here on the floor. I have talked about it for a lot of years. There are 72 clinical human trials using adult cord research. If we want the people Senator FEINSTEIN and others talked about to get cures now, the certain way to do this is to not fund embryonic stem cell research. The people she is talking about are not going to be cured any time soon.

I want to read some quotes from scientists talking about cures from embryonic stem cell research. I want to lay my hands on this real quick so that people can hear what the scientists are saying about this particular area. Let me get to that in a second, as soon as we can pull that out from the notebook.

I want to hit a second point on this and then print this for the RECORD. Mr. President, I will ask unanimous consent that this be printed in the RECORD at the end of my statement.

Mr. President, this is a series of one-page—a cover article on stem cells, embryonic stem cells forming tumors. We have talked about this being a problem. This has been a problem on fetal tissue research, about 15 years ago. This stack is of the front pages of peerreviewed articles citing embryonic stem cells creating tumors when implanted in other animals. Let me just read a few of these summations. This is just the front cover, and people can look up the whole article if they want.

More than 70 percent of the mice that received embryonic stem cells derived neuro processors—or precursor cells developed teratomas, 70 percent teratomas, tumors. That was a 2006 article.

Rats grafted with embryonic stem cells de-differentiated in vitro for 16 days developed severe teratomas—tumors. This is an article for publication, March of 2006. I am just reading the front page of these.

Here is another article, a 2005 article. We conclude that pluripotent cell types used in this study are unsuitable for achieving safe engraftment in a Guinea pig brain. Why? Creation of teratomas—tumors.

Unlimited self-renewal and high differentiated potential poses the risk of tumor induction after engraftment. This is just the front page of another article. December of 2004.

Here is another article. Conclusions: the cells will, however, form a tumor if they leak into an improper space such as the thoracic cavity. This is an article from 2003.

Then I have three more articles. These are just summations of peer-reviewed articles. They form tumors. That is the problem with embryonic stem cells.

So the Senators from California, Michigan, Iowa, and Pennsylvania and other places saying we want cures-I want cures. The research is saying embryonic stem cells form tumors. You put them into individuals, they form tumors. And while we hope at some point in time something positive happens, the problem is, they form tumors. This isn't working. So if we want treatments and cures, the answer isn't embryonic stem cells, it is adult stem cells, cord blood, where we don't have a tumor formation problem and where we are getting all of these initial successes that are taking place

We are also going to consider legislation—and I will come back to another point here—we are going to consider legislation on fetus farming. There are three bills that are up and one of the bills is to ban fetal farming—fetus farming. I want to speak on that bill. I am a cosponsor of the bill. It would prohibit a gruesome procedure known as fetus farming. I am hopeful this passes with broad bipartisan support.

What this prevents is growing young humans to a certain stage, then harvesting their parts like an organ donor—parts. You grow a cloned human to a certain stage, let the cells differentiate and then harvest the parts. The Fetus Farming Prohibition Act is intended to prevent the exploitation of women for the purpose of harvesting spare organs, bodies parts, and tissue. In an ideal world we wouldn't need this type of legislation, yet we have already seen four scientific papers published on proof of concept of where they clone an animal to harvest the tissue to put into another animal to see if there was a rejection issue. Such proof of concept or proof of principle is simply the first case you take before actually moving to doing it in humans. That is why we seek to ban this particular procedure.

Some of my colleagues are saying of course nobody would think about doing this. I remember at the outset of this debate 8 years ago, everybody said of course we are not going to clone human beings. That is not necessary; that is abhorrent, and we wouldn't do that. The same people who were saying that are now saying it is essential we clone human beings, so the distance from "of course we would never" to "of course we must" seems to only take a matter of years and that is why we are seeking to ban this particular area of

using human beings. Human beings, as I said at the outset, are ends in themselves. They should not be used for somebody else's purposes. It is beneath human dignity to turn humans into commodities—that is organ factories—and that would be the case with fetus farming. That is what this act does; it prohibits it. I am hopeful my colleagues can strongly support this ban on fetal farming that is going to come before this body and I hope will pass the House and be sent to the President for signature.

I want to talk about an area that perhaps we all pretty easily fall into. That is, we get contacted by individuals who have a particular malady or disease or genetic problem and we tell them we want to give them a cure.

We do want to give them a cure. Everyone in this body wants to give them a cure. But then false hope can be held out or people can start down a road that doesn't produce. That is where we have been going. That is where we are going with the embryonic stem cells. This is a route into which we put half a billion Federal taxpayer dollars and it hasn't produced. It is time to move somewhere else. We have tried this route before.

I want to quote one of my colleagues on fetal tissue research. Some of my colleagues remember 10 or 15 years ago we were debating fetal tissue research. The promises sound strangely familiar, what people said.

There is substantial evidence that fetal tissue research will offer a new hope of prolonged life, greater quality of life, and perhaps one day even a cure for many of these diseases at a tremendous economic and social cost-saving to the country.

Then people frequently would list different areas that would be covered, such as Alzheimer's and Parkinson's disease and the like.

We funded fetal tissue research. The reason I mentioned this is it is quite a bit like fetal farming. In fetal tissue research the fetus is aborted and then body parts harvested for use in somebody else, and that was going to cure everybody. We were going to get rid of Alzheimer's and Parkinson's and Lou Gehrig's and cancer and all these areas with great promise. Yet we saw what happened on the fetal tissue research.

Parkinson's research is set back by failure of fetal cell grants—disastrous side effect—absolutely devastating—it was tragic, catastrophic, it's a real nightmare. And we can't selectively turn it off.

That was what the researchers said when they took fetal tissue and put it in somebody to deal with Parkinson's disease. What we are trying to prohibit with the Fetal Farming Act is this from backing up even further, or doing it in a clone state, and inserting cancerous tumors into individuals. You can't selectively turn it off. That is why we want to ban this. That is why it is the wrong thing to do. It was the wrong thing to do then, using fetal tissue in that particular case.

It is also the wrong thing to promise people these cures when we look at the

science of this and you know pretty likely this is not going to work-from all the scientific evidence. Let me read from some of the eminent scientists. By the way, the material I had printed for the RECORD on tumor formation, I believe every one of these scientists, at least most of the scientists published in these articles, are pro embryonic stem cell research. They support embryonic stem cell research. They want it to work. The problem is, tumor formation, just as we saw with fetal tissue research. The cell grows fast, undifferentiated, but it can get in the brain and in some cases formed fingernails or hair follicles instead of brain tissue.

What are some of the scientists who are strong embryonic stem cell supporters saying about the likelihood of human treatments using embryonic stem cells? Here I am quoting from people who support this research. Lord Winston, a British stem cell expert, has warned his colleagues over the political hype in support of human embryonic stem cells:

One of the problems is that in order to persuade the public that we must do this work, we often go rather too far in promising what we might achieve. This is a real issue for the scientists. am not entirely convinced that embryonic stem cells will, in my lifetime, and possibly anybody's lifetime for that matter, be holding quite the promise that we desperately hope they will.

This was in a lecture he gave in 2005. If we want to cure people, as different colleagues are talking about and giving different human examples, people examples—this is a clear route here, adult and cord blood. Put the money there if we want to cure people. If we want to do the scientific research, that is another thing, but if we want to cure people, we have an answer and it has no ethical problem to it. But we should not overhype the embryonic stem cells when the lead scientist say he thinks it is unlikely any time soon, if ever, to work, as I just quoted to you there.

Let me give another quote from the journal "Science." It carried a piece last summer in which supporters of embryonic—destructive human embryonic stem cell research admitted:

It is necessary that prospective donors of human eggs recognize the large gap between research and therapy. This is particularly important in frontier areas of research where therapeutic impact in humans is unproven.

Also, it is nearly certain that the clinical benefits of the research are years or maybe decades away. This is a message that desperate families and patients will not want to hear.

If we are talking cures, we have an answer here. But it is not embryonic stem cell research. Otherwise we should not be talking about cures. We should be talking maybe about research on embryonic stem cells. We are interested in how they work, but we should not be talking cures because the cures are coming in the adult and cord blood route.

I will have the "Science" article printed. I ask unanimous consent all these be printed in the RECORD at the end of my presentation.

The PRESIDING OFFICER. Without objection, it is so ordered.

(See exhibit 1.)

Mr. BROWNBACK. This is an op-ed piece in the Washington Post. David Shaywitz put it in, in 2005.

While stem cell advocates have helped voters connect stem cell research with compelling images of patients who might one day benefit from treatments, such therapies are unlikely to emerge soon enough to benefit most current proponents. . . .

... scientists must do a better job of articulating the limitations of our existing knowledge, taking care to emphasize not only the ultimate therapeutic potential of these cells, but also how far we are from achieving such therapies.

That is from scientists who support embryonic stem cell research. Let's be clear what we are talking about in this particular field.

Now I want to talk about the pluripotent nature of adult stem cells. Here, Dr. Coburn, Dr. Frist, and others would be better qualified, obviously, than I could ever dream of being about this topic, but this has been raised for some period of time. The theory has gone, embryonic stem cells are pluripotent, they can form any type of cells. Adult stem cells cannot. Their plasticity is insufficient for them to be able to form other types of cells.

I simply point to this chart, listing 16 peer-reviewed studies showing alternative sources of pluripotent stem cells other than embryonic stem cells, and almost all of these are out of adult stem cells—pluripotency.

I urge my colleagues, the science has moved quite rapidly on this. I hope we can get up to speed with where the science is on this. There pluripotency in other stem cells. There is pluripotency in cells other than the embryonic stem cells. We have the alternative bill, the Santorum-Specter bill, looking at other alternative sources of embryonic-type like stem cells that you do not have to destroy an embryo to get to. Look at those fields and those areas, these adult stem cells and this research, rather than saying the only source is embryonic, because it is not. That is not the only source because the science continues to move on through this and find other areas of pluripotency in adult stem cells as they are created.

Because I have a little bit of time—I ask the Chair, how much time is remaining?

The PRESIDING OFFICER. The Senator has  $4\frac{1}{2}$  minutes.

Mr. BROWNBACK. Fantastic. I have a picture I want to show, then, because this is a real hope. It is also a bit of a tragedy. Here is a gentleman I hosted at a hearing about Parkinson's disease. He suffers from Parkinson's disease. He had an adult stem cell treatment. We got him in to testify. It is adult stem cells put back in his own part of the brain, it is his own cells, so there is not a rejection problem. He was Parkinson's free for 5 years. We had trouble

getting him in to testify. He was out doing African safaris and things. We couldn't get him to come in.

I say that because that is the beauty of it. The tragedy of it is some of the Parkinson's traits are coming back. He would love to have another treatment for Parkinson's with his own adult stem cells. Yet we have so few clinical trials going on, we are so short in the funding of this, that he is not able to get additional treatments or other Parkinson's patients aren't able to get this.

I ask my colleagues, if we want to treat, let's take the half a billion dollars and let's put it into research for a guy such as this, where we have a real promising start. He was Parkinson's free of things here for 5 years, and then it started coming back.

My final comment I have in the time I have left is: What a beautiful time. What an opportunity we have for people to live longer and better lives. This is a glorious time for us to make a step forward.

Senator Feinstein from California and I cochair the cancer caucus. We are setting an objective of ending deaths by cancer in 10 years. It is going to have to be aggressive to be able to do this. We are going to have to do some work on these adult and cord blood stem cell areas. What a beautiful time. Let's invest wisely. Let's not check our morals at the door—our values. Let's treat every single human as a sacred, beautiful child of the living God and we are going to be here 10 years from now with amazing stories of things that have happened, and a happy heart, and a clear conscience at the same timethat we did it, we did it the right way, that more people are alive today, not dead, we didn't sacrifice other human beings in the process, and people are cured. People with spinal cord injuries are walking. People with Parkinson's no longer have it.

We have people in whom this is taking place today. We didn't give them cancer in the process of trying to cure them—where we are having the troubles with the embryonic stem cells.

This can happen if we will go the right way, ban the fetal farming, not expand and use taxpayer dollars to fund destructive human embryonic research where you destroy a human, and look at these alternatives. It can and it will happen. And that—that is going to be a beautiful day.

I believe my time has expired and I yield the floor

## Ехнівіт 1

STEM-CELL REALITY: "ESC TREATMENTS DECADES AWAY"

"Similarly, it is important not to use the term 'therapy' when what is meant is 'research' and not to refer to human embryonic stem cell research as 'therapeutic cloning.' There is currently no such thing as 'therapeutic cloning' and this is not 'therapeutic cloning research,' nor can we say with any certainty that "cell therapy" is in the near future."

(Source: Magnus & Cho, "Issues in Oocyte Donation for Stem Cell Research," Science Vol. 308, 1747–1748, June 17, 2005.) Last summer, the prestigious journal Science carried a piece, in which supporters of destructive human embryonic stem cell research admit:

"It is necessary that prospective donors [of human eggs] recognize the large gap between research and therapy. This is particularly important in frontier areas of research where therapeutic impact in humans is unproven.

"Also, it is nearly certain that the clinical benefits of the research are years or maybe decades away. This is a message that desperate families and patients will not want to hear

STEM-CELL REALITY: OVER-HYPED ESC'S British Stem Cell Expert Lord Winston

Lord Winston, a British stem cell expert, has warned his colleague over the political hype in support of human embryonic stem cells:

"One of the problems is that in order to persuade the public that we must do this work, we often go rather too far in promising what we might achieve.

This is a real issue for the scientists. I am not entirely convinced that embryonic stem cells will, in my lifetime, and possibly anybody's lifetime for that matter, be holding quite the promise that we desperately hope they will."

(Source: "Should We Trust the Scientists?" Gresham College Lecture, June 20, 2005)

# STEM-CELL REALITY: "ESC THERAPIES UNLIKELY SOON"

Harvard stem cell researcher—and proponent of destructive human embryonic stem cell research—David Shaywitz writes in an op-ed carried by the Washington Post:

"While stem cell advocates have helped voters connect embryonic stem cell research with compelling images of patients who might one day benefit from treatment, such therapies are unlikely to emerge soon enough to benefit most current proponents

"... scientists must do a better job of articulating the limitations of our existing knowledge, taking care to emphasize not only the ultimate therapeutic potential of these cells, but also how far we are from achieving such therapies."

(Source: David Shaywitz, "Stem Cell Reality," The Washington Post, April 29, 2005.)

[From the New York Times, Mar. 8, 2001] PARKINSON'S RESEARCH IS SET BACK BY FAILURE OF FETAL CELL IMPLANTS

(By Gina Kolata)

A carefully controlled study that tried to treat Parkinson's disease by implanting cells from aborted fetuses into patients' brains not only failed to show an overall benefit but also revealed a disastrous side effect, scientists report.

In about 15 percent of patients, the cells apparently grew too well, churning out so much of a chemical that controls movement that the patients writhed and jerked uncontrollably.

The researchers say that while some patients have similar effects from taking too high a dose of their Parkinson's drug, in this case the drugs did not cause the symptoms and there is no way to remove or deactivate the transplanted cells.

On the researchers' advice, six patients who enrolled in the study but who had not yet had the implantation operation have decided to forgo it.

The results, reported today in The New England Journal of Medicine, are a severe blow to what has been considered a highly promising avenue of research for treating Parkinson's disease, Alzheimer's disease and other neurological ailments. The study indicates that the simple solution of injecting fetal cells into a patient's brain may not be enough to treat complex diseases involving nerve cells and connections that are poorly understood. Some say it is time to go back to the laboratory and to animals before doing any more operations on humans.

The findings may also fuel the debate over whether it is appropriate to use tissue from aborted fetuses to treat diseases. Despite their disappointment, some researchers said they hoped that the results would not bring fetal cell research to an abrupt halt. The research has been controversial because the fetal cells were obtained from abortion clinics

"This is still our one great hope for a cure," said Dr. J. William Langston, who is scientific director and chief executive officer at The Parkinson's Institute in Sunnyvale,

Parkinson's disease occurs when cells of the substantia nigra region in the base of the brain die, for unknown reasons. The hope was that fetal substantia nigra cells might take over for them. But, the study showed, in older patients the operation had no benefit and in some younger patients, the transplants brought on nightmarish side effects.

Although the paper depicts the patients with the side effects in impassive clinical terms, doctors who have seen them paint a very different picture.

Dr. Paul E. Greene, a neurologist at the Columbia University College of Physicians and Surgeons and a researcher in the study, said the uncontrollable movements some patients suffered were "absolutely devastating."

"They chew constantly, their fingers go up and down, their wrists flex and distend," Dr. Greene said. And the patients writhe and twist, jerk their heads, fling their arms about.

"It was tragic, catastrophic," he said. "It's a real nightmare. And we can't selectively turn it off."

One man was so badly affected that he could no longer eat and had to use a feeding tube, Dr. Greene said. In another, the condition came and went unpredictably throughout the day, and when it occurred, the man's speech was unintelligible.

For now, Dr. Greene said, his position is clear: "No more fetal transplants. We are absolutely and adamantly convinced that this should be considered for research only. And whether it should be research in people is an open question."

Dr. Gerald D. Fischbach, who was director of the National Institute of Neurological Disorders and Stroke, which sponsored the study, said that while the operation had been promoted by some neurosurgeons as miraculous, this was the first time it was rigorously evaluated. It used sham surgery as a comparison, a controversial and rarely used strategy but one that researchers felt was necessary to understand the true effects of the operation.

Dr. Fischbach, who is now dean of the faculty of medicine at the Columbia University College of Physicians and Surgeons, was the director of the institute only at the end of the study.

"Ad hoc reports of spectacular results can always occur," Dr. Fischbach said. "But if you do these studies systematically, this is the result you get."

The surgery, he added, "is not the final solution that people would have hoped going into it."

In the study, researchers, led by Dr. Curt R. Reed of the University of Colorado Health Sciences Center in Denver and Dr. Stanley Fahn of the Columbia University College of Physicians and Surgeons, recruited 40 patients, ages 34 to 75, who had had Parkinson's disease for an average of 14 years. The patients were randomly assigned to have substantia nigra cells from four fetuses implanted in their brains or to have sham surgery, for comparison.

The surgery took place in Colorado and the patients were evaluated in New York. The fetal cell surgery involved drilling four small holes in the patient's forehead and then inserting long needles through the holes into the brain and injecting fetal cells. The sham surgery involved drilling the holes but not injecting needles into the brain. After a year, the patients were told whether they had the fetal cell surgery and, if not, they were offered it if they wanted it.

The study's primary measure of success was whether the patients themselves noticed that they were better, as determined by a survey that they mailed in a year later but before they knew whether they had had fetal cell implants or a sham operation. The study found no difference between the two groups—neither those who had had the fetal cell operation nor those who had had the sham surgery notice an improvement in their symptoms.

Other tests, like neurologists' assessments of the patients while they were taking their medication and the patients' assessments of their condition in diaries they kept also showed no effect of the surgery. And there was no difference between the two groups in the doses of drugs needed to control the disease

The one glimmer of hope came from assessments by neurologists before the patients had had their first dose of medication in the morning. By that measure, the 10 patients under age 60 who had had the fetal cell implants seemed better than those who had had sham surgery, with less rigidity, although their tremor was just as bad.

Dr. Freed hailed that result, saying, "It was clear-cut improvement."

And, he added, the fetal cells survived in most patients' brains.

"I would be disappointed if people used a strict clinical trial approach," Dr. Freed said. "This study is about multiple phenomena."

Others were less enthusiastic, pointing out that finding subgroups after the fact who may have benefited suggests a hypothesis for future studies not evidence of an effect.

"We try to teach everybody that you have to identify beforehand what's the primary outcome," said Dr. William Weiner, the director of the Maryland Parkinson's Disease and Movement Disorder Center and a professor of neurology at the University of Maryland School of Medicine in Baltimore, referring to the measure of success determined before the study began. "In this case, they picked a subjective assessment by the patients themselves, which I think is a very good one."

And so, Dr. Weiner said, when the patients noticed no improvement, "the study was negative."

In addition, Dr. Langston said, even if a Subsequent study confirmed that the surgery had an effect on the condition in younger patients before they took their medicine in the morning, and even if there was a way of preventing the terrible side effect, the operation would still hardly be a breakthrough. Parkinson's disease is almost always a disease of the elderly, he noted, adding that well under 10 percent of patients who would be candidates for the surgery are younger than 60.

The wiggling and writhing movements first emerged a year after the operation, showing up in five of the younger patients who had at first appeared to benefit from fetal cell surgery—three who had the operation in the initial phase of the study and two who had it a

year later, when they learned that they had originally had a sham surgery. While doctors sometimes see such effects in Parkinson's patients, it is caused by giving too much of drugs that act like dopamine in the brain. And it can be controlled by reducing the drugs.

In this case, however, drugs were not the culprit. Even when doctors took away the

drugs, the symptoms persisted.

The fetal implant study had been controversial from the start, both because it included sham surgery and because it used fetal tissue from abortions. But many Parkinson's disease experts said it had to be done because doctors were already offering the surgery to patients, and charging them for it, at costs of \$40,000 or more, with no evidence that they were helping them. Yet patients, facing a disease in which brain cells slowly and inexorably die and in which even the drugs that once controlled their symptoms of tremor and rigidity would inevitably fail, took their chances with the operation, thinking they had little to lose.

Dr. Freed said he was the first in the United States to offer the treatment, starting in 1988 with a 52-year-old man, who is still alive although, of course, he also still has Parkinson's disease.

Dr. Freed continued to offer it to paying patients while he was treating those who were part of the federal study and whose procedures were paid for by the study. He said he considered these other operations research because he experimented with different amounts and placements of fetal cells. He has given fetal cell implants to 27 patients, he said, with the most recent operation last October.

Dr. Freed said his group was now implanting less fetal tissue and putting the tissue in a different area of the brain, hoping to avoid the devastating side effects. But, he said it would be a mistake to stop doing the surgery altogether.

"To say that you can't do or shouldn't do human research because the research has uncertain outcome, I think would be a bad decision," Dr. Freed said.

Meanwhile, a second federally financed study of the operation is winding to a close, and some researchers say it is time to go back to animal studies and learn more about the complex roles of the brain cells involved in Parkinson's disease.

Dr. Weiner said that if a patient came to him today seeking advice, he would say: "The bottom line for patients is that human fetal cell transplants are not currently the best way to go. If you are willing to pay for them, you can still have them done. But my advice is you ought not to do this."

[FROM STEM CELLS EXPRESS, FEB. 2, 2006]

EMBRYONIC STEM CELL-DERIVED NEURONALLY COMMITTED PRECURSOR CELLS WITH RE-DUCED TERATOMA FORMATION AFTER TRANS-PLANTATION INTO THE LESIONED ADULT MOUSE BRAIN

### (By Marcel Dihné) ABSTRACT

The therapeutic potential of embryonic stem (ES) cells in neurodegenerative disorders has been widely recognized, and methods are being developed to optimize culture conditions for enriching the cells of interest and to improve graft stability and safety after transplantation. Whereas teratoma formation rarely occurs in xenogeneic transplantation paradigms of ES cell-derived neural progeny, more than 70% of mice that received murine ES cell-derived neural precursor cells develop teratomas, thus posing a major safety problem for allogeneic and syngeneic transplantation paradigms. Here

we introduce a new differentiation protocol based on the generation of substrate-adherent ES cell-derived neural aggregates (SENAs) that consist predominantly of neuronally committed precursor cells. Purified SENAs that were differentiated into immature but postmitotic neurons did not form tumors up to four months after syngeneic transplantation into the acutely degenerated striatum and showed robust survival.

[From Stem Cells Express, Mar. 23, 2006]

TRANSPLANTATION OF HUMAN EMBRYONIC STEM CELL-DERIVED CELLS TO A RAT MODEL OF PARKINSON'S DISEASE: EFFECT OF IN VITRO DIFFERENTIATION ON GRAFT SURVIVAL AND TERATOMA FORMATION

### (By Anke Brederlau)

#### ABSTRACT

Human embryonic stem cells (hESCs) have been proposed as a source of dopamine (DA) neurons for transplantation in Parkinson's disease (PD). We have investigated the effect of in vitro predifferentiation on in vivo survival and differentiation of hESCs implanted into the 6-OHDA (6-hydroxydopamine)-lesion rat model of PD. The hESCs were cocultured with PA6 cells for 16, 20, or 23 days, leading to the in vitro differentiation into DA neurons. Grafted hESC-derived cells survived well and expressed neuronal markers. However, very few exhibited a DA neuron phenotype. Reversal of lesion-induced motor deficits was not observed. Rats grafted with hESCs preadifferentiated in vitro for 16 days developed severe teratomas, whereas most rats grafted with hESCs predifferentiated for 20 and 23 days remained healthy until the end of the experiment. This indicates that prolonged in vitro differentiation of hESCDs is essential for preventing formation of teratomas.

## [From Neuroscience Research, 2005]

SURVIVAL AND ENGRAFTMENT OF MOUSE EMBRYONIC STEM CELL-DERIVED IMPLANTS IN THE GUINEA PIG BRAIN

## (By A.J. Robinson)

## ABSTRACT

 $\alpha\textsc{-Mannosidosis}$  is a lysosomal storage disease resulting from a deficiency of the enzyme  $\alpha\textsc{-D-mannosidase}$ . A major feature of  $\alpha\textsc{-mannosidosis}$  is progressive neurological decline, for which there is no safe and effective treatment available. We have a guinea pig model of  $\alpha\textsc{-mannosidosis}$  that models the human condition. This study investigates the feasibility of implanting differentiated mouse embryonic stem cells in the neonatal guinea pig brain in order to provide a source of  $\alpha\textsc{-mannosidase}$  to the affected central nervous system.

Cells implanted at a low dose (1.5 103 cells per hemisphere) at 1 week of age were found to survive in very low numbers in some immunosuppressed animals out to 8 weeks. Four weeks post-implantation, cells implanted in high numbers (105 cells per hemisphere) formed teratomas in the majority of the animals implanted. Although implanted cells were found to migrate extensively within the brain and differentiate into mature cells of neural (and other) lineages, the safety issue related to uncontrolled cell proliferation precluded the use of this cell type for longer-term implantation studies. We conclude that the pluripotent cell type used in this study is unsuitable for achieving safe engraftment in the guinea pig brain.

[From Investigative Ophthalmology & Visual Science, Dec. 2004]

NEURALLY SELECTED EMBRYONIC STEM CELLS INDUCE TUMOR FORMATION AFTER LONG-TERM SURVIVAL FOLLOWING ENGRAFTMENT INTO THE SUBRETINAL SPACE

(By Stefan Arnbold, Helmut Klein, Irina Semkova, Klaus Addicks, and Ulrich Schraermeyer)

Purpose. To determine whether transplantation of embryonic stem (ES) cells into the subretinal space of rhodopsin-knockout mice has a tumorigenic effect.

Methods. Mouse ES-cell-derived neural precursor cells carrying the sequence for the green fluorescent protein (GFP) gene were grafted subretinally into the eyes of rhodopsin-/- mice, whereas control animals underwent sham surgery. Eyes were retrieved after 2, 4, and 8 weeks after cell injection or sham surgery for histologic analysis.

Results. Gross morphologic, histologic, and immunohistochemical analysis of eyes at 2 and 4 weeks after engraftment exhibited no morphologic alterations, whereas neoplasia formation was detected in 50% of the eyes evaluated at 8 weeks after engraftment. Because the neoplasias expressed differentiation characteristics of the different germ layers, they were considered to be teratomas. The resultant tumor formation affected almost all layers of the eye, including the retina, the vitreous, and the choroid.

Conclusions. Although ES cells may provide treatment for degenerative disease in the future, their unlimited self-renewal and high differentiation potential poses the risk of tumor induction after engraftment. Thus, more care must be taken before using ES cell transportation as a therapeutic option for patients with degenerative disease.

[From Transplantations, Oct. 15, 2003]

ENGRAFTMENT AND TUMOR FORMATION AFTER ALLOGENEIC IN UTERO TRANSPLANTATION OF PRIMATE EMBRYONIC STEM CELLS

## (By Takayuki Asano)

Background. To achieve human embryonic stem (ES) cell-based transplantation therapies, allogeneic transplantation models of nonhuman primates would be useful. We have prepared cynomolgus ES cells genetically marked with the green fluorescent protein (GFP), The cells were transplanted into the allogeneic fetus, taking advantage of the fact that the fetus is so immunologically immature as not to induce immune responses to transplanted cells and that fetal tissue compartments are rapidly expanding and thus providing space for the engraftment.

Methods. Cynomolgus ES cells were genetically modified to express the GFP gene using a simian immunodeficiency viral vector or electroporation, These cells were transplanted in utero with ultrasound guidance into the cynomolgus fetus in the abdominal cavity (n=2) or liver (n=2) at the end of the first trimester. Three fetuses were delivered 1 month after transplantation, and the other, 3 months after transplantation Fetal tissues were examined for transplanted cell progeny by quantitative polymerase chain reaction and in situ polymerase chain reaction of the GFP sequence.

Results. A fluorescent tumor, obviously derived from transplanted ES cells, was found in the thoracic cavity at 3 months after transplantation in one fetus. However, transplanted cell progeny were also detected (~1%) without teratomas in multiple fetal tissues. The cells were solitary and indistinguishable from surrounding host cells

Conclusions. Transplanted cynomolgus ES cells can be engrafted in allogeneic fetuses. The cells will, however, form a tumor if they "leak" into an improper space such as the thoracic cavity.

[From the American Journal of Pathology, June 2005]

STEM CELLS. TISSUE ENGINEERING HEMATOPOIETIC ELEMENTS: TERATOMA FOR-MATION LEADS TO FAILURE OF TREATMENT FOR TYPE I DIABETES USING EMBRYONIC STEM CELL-DERIVED INSULIN-PRODUCING CELLS

#### (By Takahisa Fujikawa)

Embryonic stem (ES) cells have been proposed to be a powerful tool in the study of pancreatic disease, as well as a potential source for cell replacement therapy in the treatment of diabetes. However, data dem onstrating the feasibility of using pancreatic islet-like cells differentiated from ES cells remain controversial. In this study we characterized ES cell-derived insulin-expressing cells and assessed their suitability for the treatment of type I diabetes. ES cell-derived insulin-stained cell clusters expressed insulin mRNA and transcription factors associated with pancreatic development. The majority of insulin-positive cells the clusters also showed immunoreactivity for C-peptide. Insulin was stored in the cytoplasm and released into the culture medium in a glucosedependent manner. When the cultured cells were transplanted into diabetic mice, they reversed the hyperglycemic state for ~3 weeks, but the rescue failed due to immature teratoma formation. Our studies demonstrate that reversal of hyperglycemia by transplantation of ES cell-derived insulinproducing cells is possible. However, the risk of teratoma formation would need to be eliminated before ES cell-based therapies for the treatment of Diabetes are considered.

### [From Somatosensory and Motor Research, Mar./June 2005]

Transportation of Apoptosis-Resistant EMBRYONIC STEM CELLS INTO THE INJURED RAT SPINAL CORD

### (By Michael J. Howard) ABSTRACT

Murine embryonic stem cells were induced to differentiate into neural lineage cells by exposure to retinoic acid. Approximately one million cells were transplanted into the lesion site in the spinal cords of adult rats which had received moderate contusion injuries 9 days previously. One group received transplants of cells genetically modified to over-express bel-2, which codes for an antiapoptotic protein. A second group received transplants of the wild-type ES cells from which the bcl-2 line was developed. In the untransplanted control group, only medium was injected. Locomotor abilities were assessed using the Basso, Beattie and Bresnahan (BBB) rating scale for 6 weeks. There was no incremental locomotor improvement in either transplant group when compared to control over the survival period.

Morbidity and mortality were significantly more prevalent in the transplant groups than in controls. At the conclusion of the 6week survival period, the spinal cords were examined. Two of six cords from the bc-2 group and one of 12 cords from the wild-type group showed gross evidence of abnormal growths at the site of transplantation. No similar growth was seen in the control. Pathological examination of the abnormal cords showed very large numbers of undifferentiated cells proliferating the injection site and extending up to 1.5 cm rostrally and caudally. These results suggest that transplanting KD3 ES cells, or apoptosisresistant cells derived from KD3 line, into the injured spinal cord does not improve locomotor recovery and can lead to tumor-like growth of cells, accompanied by increased debilitation, morbidity and morality.

#### [From Diabetologia, Feb. 14, 2004]

INSULIN EXPRESSING CELLS FROM DIFFEREN-TIATED EMBRYONIC STEM CELLS ARE NOT BETA CELLS

### (By S. Sipione) ABSTRACT

Aim/hypothesis. Embryonic stem (ES) cells have beer proposed as a potential source of tissue for transplantation for the treatment of Type 1 diabetes. However studies showing differentiation of beta cells from ES cells are controversial. The aim of this study was to characterise the insulin-expressing cells differentiated in vitro from ES cells and to assess their suitability for the treatment of diabetes.

Methods, ES cell-derived insulin-expressing cells were characterised by means of immunocytochemistry, RT-PCR and functional analyses. Activation of the Insulin I promoter during ES-cell differentiation was assessed in ES cell lines transfected with a reporter gene. ES cell-derived cultures were transplanted into STZ-treated SCID-beige mice and blood glucos concentrations of diabetic mice were monitored for 3 weeks.

Results. Insulin-stained cells differentiated from E cells were devoid of typical beta-cell granules, rarely showed immunoreactivity for C-peptide and were mostly apoptotic. The main producers of proinsulin/insulin in these cultures were neurons and neuronal precursors and a reporter gene under the control of the insulin I promoter was activated in cells with a neuronal phenotype. Insulin was released into the incubation medium but the secretion was not glucose-dependent. When the cultures were transplanted in diabetic mice they formed teratomas and did not reverse the hyperglyceamic state.

Conclusions/Interpretation. Our show that insulin-positive cells in vitro-differentiated from ES cells are not beta cells and suggest that alternative protocols, based

on enrichment of ES cell-derived cultures with cells of the endodermal lineage, should be developed to generate true beta cells for the treatment of diabetes.

The PRESIDING OFFICER. Under the previous order, the minority is in control of the next 30 minutes.

Mr. HARKIN. Mr. President, I was going to ask the Senator from Kansas-I will even do it on my time. I guess our next speaker is not here right now. If the Senator from Kansas would perhaps engage me in a colloquy, I would ask about the gentleman whose picture he has up there. How is he doing now? I understand that, frankly, while his Parkinson's was relieved for a while, it has reverted and he is back in his previous state. Does the Senator know about that?

Mr. BROWNBACK. Yes. If you caught my comments on the floor, I stated that is part of the tragedy here. He had 5 years Parkinson's free, wants an additional treatment using the same adult stem cell procedure he had before that worked, and can't get it. We don't have sufficient funding to move that on forward.

Mr. HARKIN. I say to my friend, I don't understand that. I have a chart here that shows stem cell funding, embryonic stem cell funding, is \$38.3 million last year and adult stem cell funding is \$200 million. You are telling me out of \$200 million they can't help one individual?

Plus, I ask my friend from Kansas, if this is so promising, why is the entire Parkinson's network that represents all the people with Parkinson's disease 100 percent behind H.R. 810? Why are they so supportive of H.R. 810 and not this approach?

Mr. BROWNBACK. If I could answer on both of those, I would have printed in the RECORD the funding over the past 4 years for both embryonic and adult and cord blood stem cells. We put about half a billion in embryonic, both animal and human, over the past 5 years. I ask unanimous consent to have this printed in the RECORD, to point to the level of funding we have put in both of those

There being no objection, the material was ordered to be printed in the RECORD, as follows:

# U.S. FEDERAL TAXPAYER FUNDING, TOTAL NIH STEM CELL RESEARCH, FY 2002-2006

[Dollars in millions] 1

	FY 2002 actual			FY 2003 actual			FY 2004 actual			FY 2005 actual			Combined total		
	Non-embry- onic	Embryonic	Total	Non-embry- onic	Embryonic	Total	Non-embry- onic	Embryonic	Total	Non-embry- onic	Embryonic	Total	Non-embry- onic	Embryonic	Total
Human, Subtotal Nonhuman	170.9	10.1	181.0	190.7	20.3	211.0	203.2	24.3	227.5	199.4	39.6	239.0	764.2	94.3	858.5
Subtotal	134.1	71.5	205.5	192.1	<sup>2</sup> 113.5	305.6	235.7	2 89.3	325.0	273.2	97.0	370.2	835.1	371.3	1206.3
NIH, Total	305.0	81.6	386.6	382.9	<sup>2</sup> 133.8	516.6	439.0	<sup>2</sup> 113.6	552.5	472.5	136.7	609.2	1599.4	465.7	2064.9

Mr. BROWNBACK. Second, I would point out on Parkinson's, I don't know why the Parkinson's advocacy community would support that. I find it hard to believe they would oppose us doing

more work in this field. I would simply ask you, or others, if we have a place that is working and we have another place that is producing tumors, why

wouldn't you put more in a place that is working?

Mr. HARKIN. I say to my friend from Kansas—and I see Senator Nelson is here to speak. He had previously been

<sup>&</sup>lt;sup>1</sup> Numbers may not add due to rounding.
<sup>2</sup> Decrease from FYO3 to FYO4 is the result of a change in methodology used to collect nonhuman embryonic funding figures. This methodology change also contributed to an increase in nonhuman non-embryonic.

scheduled to do so—first, I didn't see all the figures the Senator sent to the desk. I would like to see those. I heard him talk about a half billion dollars. Frankly, what the Senator from Kansas is talking about is animal embryonic. We are talking about human—human experiments here, not animal.

Mr. BROWNBACK. If I could respond? Mr. HARKIN. I am more interested in the human than I am about human and animal.

Second, on cancer and tumors, it is my understanding—I am not a scientist, but in talking with the scientists—the fact that an undifferentiated stem cell causes cancer is exactly what they are looking for. It is the gold standard. I thought it was the gold standard for determining whether you have an embryonic stem cell.

Let me see if I can repeat it as told to me. If you derive a stem cell line from an embryo, you don't really know if you have stem cells. So the scientists take the undifferentiated cells and put them in a mouse to see if it causes cancer. That is the gold standard—to see whether there is a stem cell line.

No one is talking about putting undifferentiated cells into your body or mine or anyone else's. We are talking about undifferentiated cells and then finding how they make nerve cells, how they make heart cells, how they make tissue cells, how they make brain cells. Only after they are differentiated would they then be put into a person, not undifferentiated.

I hear all about the terms. I heard that earlier this morning. I thought I would check up on it. That is what I found out.

I would be glad to engage in a colloquy.

Mr. COBURN. Mr. President, let me clarify for the record. I think it is very important. There is a difference between cancer and teratoma. They use the formation of teratomas to make a differentiation of whether this is a part of the cell. That is not a cancer. Teratomas are not necessarily cancer. They are tumors but not necessarily cancer.

Mr. HARKIN. They are tumors. That is what I heard the Senator say.

Mr. COBURN. If you do not have a tumor, I would just as soon have a teratoma as cancer.

Mr. HARKIN. I don't know. I am a little confused. Is the Senator saying, if a stem cell has been introduced and is undifferentiated, it causes cancer or teratoma?

Mr. COBURN. No. The Senator alluded to the fact that there is a gold standard of whether an embryonic stem cell is pluripotent or whether it produces a teratoma. That means it has components of the three layers of an embryo—exoderm, endoderm, and mesoderm—which create all the other tissues.

Mr. HARKIN. But the fact is the inference from some of the statements, I think, is that thus far stem cells, when introduced, cause cancer. That is not

so. That has not been proven. That has not been proven at all.

Mr. COBURN. It has. Most of the time teratoma.

Mr. BROWNBACK. Mr. President, I submitted for the RECORD seven peer-reviewed articles on the creation of tumors.

Mr. HARKIN. Tumors but not cancer. Mr. BROWNBACK. We have been down this road before. We tried this on the fetal tissue research. Remember that debate of 10 to 15 years ago. They had fast-growing cells, Parkinson's, and heart disease. When we inserted them into actual human patients, here is what it did. It created disastrous results because they formed all sorts of tissues along with cancer. We have been here before, as the Senator knows, on trying to get these sort of different cells from other bodies into one.

Mr. HARKIN. We have gone down a lot of blind alleys in medical research in the past. I have often said that one of the reasons for basic research is that you have 11 doors that are closed. The answer to the problem and the answer to your endeavor may be behind one of those doors. When you have enough funding to open one door, you know what the odds are against you finding it. Or if you have funding for half, then you know what the odds are against you opening the right door. A lot of doors don't lead to anything. A lot of basic research goes down the path, and they find out that is not the answer. So they have to shift to something else. That happens all the time. That is what basic research is all about.

I do not know the specific thing. I am not surprised that many things in the past that scientists have gone down the road on have not led to something curative or therapeutic or something like that which helps us.

That doesn't mean that we have tried something before with devastating effects which doesn't say that we can't then do embryonic stem cell research.

I get back to the point that when you have almost every disease group in this country supporting the bill that is before us, H.R. 810, you have Nobel laureates, scientists, doctors, and you have 19 Directors of NIH saying that thi has great potential, then I say, again, to my friends that you have to make either one of two assumptions. Either all of these people have been hoodwinked and they do not know what they are talking about or they have no care or concern about ethics or morals or anything else. I think both assumptions are wrong. I think these people know. They are informed. They may not know every little thing medical doctors might know, but they know the potential.

Second, I think they are vastly ethical and moral people.

I hope we will have some further colloquies on this later.

Mr. BROWNBACK. I would love to respond with a quick response. I think a third option is people are kind of interested in what these cells will do. I

quoted from Lord Winston, a British stem cell researcher, saying it is an interesting area, but it is not going to produce any likely cures in my lifetime. But they are curious. They are looking at it and saying it is an interesting area of research. If we are going to cure people, let us cure people and let us talk about that kind of research.

The Senator has been very kind to let me speak.

Mr. HARKIN. The Senator has been very kind. I think we can engage at some other point.

I yield the floor.

The PRESIDING OFFICER. The Senator from Florida.

Mr. NELSON of Florida. Mr. President, we just heard a great deal of discussion and disagreement. My bottom line on this whole issue of stem cell research is that a vast majority of the medical and scientific community feels that this is a process which would lead to medical breakthroughs in the fight against disease. To this Senator, that is worth exploring.

There is hardly a Senator here whose life has not been touched by disease, in one way or another, through their family. In this particular Senator's life, my family has been touched by disease, and we don't know the cause of it. Amyotrophic lateral sclerosis, or ALS, otherwise known as Lou Gehrig's disease. It took down the great baseball player, Lou Gehrig. For years, the researchers have looked and looked and researched and researched and have not found a cure. The ALS community, along with many other communities, is concerned about the treatment and cure of diseases on which stem cell research might offer a clue.

Researchers believe that stem cells may have the potential to treat over 100 million Americans who suffer from a variety of conditions, many of which you heard already discussed on the floor of the Senate today.

There is a T-shirt that I jogged in this morning. It was given to me by the Miami Project. One of the most graphic symbols on this T-shirt is the international symbol of a wheelchair-bound person, and that international symbol suddenly starts to become upright and walks. The Miami Project was put together after the tragedy of a spinal cord injury to the son of Nick Buoniconti, the all-pro linebacker of the great Miami Dolphins team, the undefeated team of 1972. When his son was at a Citadel football game, he suffered that injury. Now the son and the father are both behind Miami Project, trying to find a cure for spinal cord injuries. And all the medical researchers feel that stem cell research is very promising for Alzheimer's, Parkinson's, cardiovascular disease, cancer. and I already mentioned ALS and diabetes.

If that occurred, think what that would mean as we grapple with the Federal budget that is going out of control because of the accelerating cost of Medicare. If we were able to

treat and cure some of these diseases, think about how much cost savings that would create. And clearly, in this Senator's mind, a secondary consideration is the fact of eliminating, almost miraculously, the plague of these diseases by the stem cells that have the ability to reproduce themselves and potentially develop into different kinds of cells in the human body.

Of course, you have already heard in the debate today about the extensive research and being able to treat certain diseases. When confronted with this a few weeks before September 11, 2001, the President announced that the administration would only allow Federal funding for this research to be used on existing colonies of embryonic stem cells. Of course, you have heard the chorus in the scientific community, since then, expressing concern about the quality, the longevity, and the availability of these lines—and they believe that the research advancement requires new embryonic stem cell lines. The key is to increase the availability of the quality embryonic stem cell lines.

The current rules have limited the supply and have resulted in fewer investigators focusing their efforts on stem cell research. Therefore, progress has been limited because of Federal funding in this research being limited. We have the ability to fix that. We can do that in this bill before the Senate.

This Senator intends to support this bill. This bill lifts the President's current restriction that allows researchers to receive the Federal funding for the study of embryonic stem cells. These stem cells can only be derived from embryos originally created for fertility treatments and that are willingly donated by patients and, I might say, that are slated to be discarded.

We will get a substantial majority of votes in the Senate. Although we hear the threats of a veto, it would be my hope the President will reexamine this issue. We are only talking about one kind of stem cell research. This is the stem cells that come through a rather complicated progress, from a fertilized egg that was going to be discarded.

There is another promising way of doing this called somatic cell nuclear transfer where it is not even a fertilized egg. You take an egg, scoop out the nucleus, take a stem cell from the donor—it can be from a skin cell—put that nucleus in, and activate the process of growing cells. That process of stem cell research has enormous promise.

This Senator has heard from thousands of Floridians who suffer on a daily basis from some of these terrible diseases. The Senate has the ability to bring hope to these people. It is time to act. The Senate should pass this bill and pass it with a fairly sizable majority, giving scientists the tools they need to search for cures.

I yield the floor.

The PRESIDING OFFICER. The Senator from Illinois

Mr. OBAMA. Mr. President, a few weeks ago I was visited by two of my constituents—Mary Schneider and her son Ryan.

When Ryan was just 2 years old, his parents and doctors noted severe delays in his motor and speech development, and he was diagnosed with cerebral palsy. His parents were devastated, as the prognosis for any children with cerebral palsy is quite grim, and given the severity of Ryan's condition, his doctors didn't have much hope for his improvement.

Yet, his parents had hope. Because when Ryan was born, his parents had saved his cord blood, a viable but limited source of stem cells. They found a doctor at Duke University who was willing to perform an experimental infusion with these cells to see if they might improve his condition.

They did. In fact, they seem to have cured him.

Within months of the infusion, Ryan was able to speak, use his arms, and eat normally, just like any other child—a miracle his family had once only dreamed of.

Ryan's story exemplifies the power and the promise of stem cells to treat and cure the millions of Americans who are suffering from catastrophic, debilitating and life-threatening diseases and health conditions.

Each year, 100,000 Americans will develop Alzheimer's disease. Over 1 million adults will be diagnosed with diabetes this year, which can lead to complications such as blindness, damaged nerves and loss of kidney function. And there are far too many individuals with spinal cord injuries who are struggling to maintain mobility and independence.

For most of our history, medicine has offered little hope of recovery to individuals affected by these and other devastating illnesses and injuries. Until now.

Recent developments in stem cell research may hold the key to improved treatments, if not cures, for those affected by Alzheimer's disease, diabetes, spinal cord injury and countless other conditions.

Many men, women and children who are cancer survivors are already familiar with the life-saving applications of adult stem cell research. Patients with leukemia or lymphoma often undergo bone marrow transplants.

One of my old law partners back in Chicago underwent a bone marrow transplant at the age of 30. It is a type of stem cell transplant which can significantly prolong life or permanently get rid of cancer. This is what happened, fortunately, to my partner. He is now cancer free. This therapy has been used successfully for decades and is saving lives every day.

Now, here is the problem. This particular breakthrough of adult stem cells has its limitations. Adult stem cells, as has already been mentioned by the distinguished Senator from Iowa, such as those which are used in bone

marrow transplants can only be collected in small quantities. They may not be a match for the patient. They have limited ability to transform into specialized cells.

Cord blood, like the kind Ryan used, has limitations as well. If, for example, Ryan's condition should deteriorate or he should have another illness, there is simply not enough cord blood cells left for a second use. His mother has told us that the few remaining cells would have to be cloned to get enough cells for future use or they would have to obtain stem cells from another source.

These and other difficulties are the reason scientists have started to explore other types and other sources of stem cells, including embryonic stem cell research. Embryonic stem cells can be obtained from a number of sources, including in vitro fertilization. At this very moment, there are over 400,000 embryos being stored in over 400 facilities throughout the United States. The majority of these are reserved for infertile couples. However, many of these embryos will go unused. destined for permanent storage in a freezer or disposal. It makes sense for us to expand and accelerate research using these embryos, just as we should continue to explore the viability of adult stem cell use and cord blood use.

All over the country, exciting progress is being made in the area of embryonic stem cell research. At the University of Illinois, they are discovering that stem cells have the potential to treat blood disorders, lung diseases, and heart damage. At Johns Hopkins, researchers use mouse embryonic stem cells to restore damaged nerves and restore mobility in paralyzed rats. One cannot help but think it is a matter of when, not if, the research will be able to help those who have lost the ability to walk.

For these reasons, I am proud to be a longtime supporter of greater stem cell research. While I was a member of the Illinois Senate, I was the chief cosponsor of the Ronald Reagan Biomedical Research Act, which would specifically permit embryonic stem cell research in Illinois and establish a review of this research by the Illinois Department of Public Health.

I am proud to be a cosponsor of the stem cell bill before the Senate today. This bill embodies the innovative thinking we as a society demand and medical achievement requires. By expanding scientific access to embryonic stem cells which would be otherwise discarded, this bill will help our Nation's scientists and researchers develop treatments and cures to help people who suffer from illnesses and injuries for which there currently are none.

The bill is not without limits. It requires that scientific research also be subject to rigorous oversight. I recognize there are serious moral and ethical issues surrounding this debate. I am respectful of those on the other side. I also realize that we are not talking about harvesting cells that would

have been used to create life. We are not talking about cloning humans. We are talking about using stem cells that would otherwise have been discarded and lost forever. We are talking about using those stem cells to possibly save the lives of millions of Americans.

Democrats want this bill passed. Conservative pro-life Republicans want this bill passed. By large margins, the American people want this bill passed. It is only the White House right now that is standing in the way of progress, standing in the way of so many potential cures.

I ask, after this bill passes—because I am confident it will pass in the Senate—that the President think about this before he picks up his pen to deliver his first veto in 6 years. I ask that he think about Ryan Schneider and his parents and all the other families sitting and waiting and praying for a cure, hoping that somewhere a researcher or scientist will find an answer.

There was a time in the middle of the last century when America watched helplessly as a mysterious disease left thousands, especially children, disabled for life. The medical community worked tirelessly to fight to try to find a cure, but they needed help. They needed funding to make their research possible.

With a world war raging and the country still emerging from the Depression, the Federal Government could hav ignored their plight or told them to find their own cure, let it be funded privately, but that is not what happened. Instead, FDR helped to galvanize a community of compassion and organized the March of Dimes to find the cure for polio. While Roosevelt knew that his own polio would never be cured by the discovery of a vaccine, he also knew that at its best, the Government can be used as a force to accomplish together what we cannot achieve on our own. So the people began to care. The dimes piled up, and the funding started to flow. And 50 years ago, Jonas Salk discovered the polio vac-

Americans are looking for that kind of leadership today. All over the country, patients and families are waiting today for Congress and the President to open the door to the cures of tomorrow. At the dawn of this new century, we should approach this research with the same passion, the same commitment that has led to so many cures and saved so many lives throughout our history. I urge my colleagues to support this bill.

I yield back the remainder of my time.

Mr. HARKIN. How much time remains on our side?

The PRESIDING OFFICER. The minority has 3 minutes.

Mr. HARKIN. Mr. President, I yield that time to the Senator from Kentucky. We had a colloquy earlier that maybe we can find some time before 5 for Senator DORGAN to speak. I yield the floor.

The PRESIDING OFFICER. Under the previous order, the majority is in control of the next 30 minutes.

The Senator from Kentucky.

Mr. BUNNING. Mr. President, I come to the Senate today to speak on the three bills related to stem cell research. One of these bills is wrong, but I believe that the other two are worthy pieces of legislation.

Stem cell research is a controversial issue in the medical, scientific, and religious communities, as well as in Congress. I am not opposed to stem cell research; however, I am 100 percent opposed to embryonic stem cell research. This is why I oppose H.R. 810, the Stem Cell Research Enhancement Act of 2005. This bill would remove all current protections against the destructive use of embryos for harvesting stem cells. I firmly believe it is wrong to take these sources of life and destroy them, even if it is for a benign purpose such as medical research.

Current Federal policy on stem cell research developed out of a compromise between proponents of research and those who endeavor to protect life at its earliest stages, brokered by President Bush. This is the first administration to allow Federal funding of embryonic stem cell research. Today's policy allows Federal funds to be used for embryonic stem cell lines that were in existence prior to August 9, 2001.

As an opponent of the destruction of human embryos, I believed the Bush administration's decision to allow the embryonic stem cell research was misguided. H.R. 810 goes even further than the current policy. It cancels the protections of the 2001 cutoff for research by allowing research of all embryonic stem cells created from in vitro fertilization treatments. This legislation would move us in the wrong direction on this issue.

Some have said that these excess embryos which would be used for research would be destroyed anyway. However, I do not think this makes ethical sense. Just because these budding lives will not survive does not mean that we should ghoulishly conduct experiments on them.

I believe there is a disconnect between what many Americans believe about this issue and what the facts are. For one, we are debating the use of Federal funds for embryonic stem cell research. We are not debating the legality of embryonic stem cell research. Any company or organization that wants to conduct or fund embryonic stem cell research may do so. I just do not think taxpayers should be forced to pay for it.

Also, there are different kinds of stem cells. Adult stem cells, such as those derived from cord blood tissue, do not require the destruction of a human embryo. Why walk down such a dangerous ethical path when there is no need to do so? These adult stem cells have proven very effective in combating several serious conditions, such

as diabetes and spinal cord injuries, among others.

This leads me to another point. We have seen the benefits that come from adult stem cell research. However, we have yet to see any tangible benefits from any embryonic stem cell research. Many scientists agree that these kinds of stem cells might—I say "might"—be able to help fight disease someday, but it has not happened yet. We are talking about ending human life when no lives have been saved yet. Who knows how many human embryos we will have to destroy before any tangible progress is made.

That being said, I am pleased to see that the Senate is considering S. 2754, the Alternative Pluripotent Stem Cell Therapies Enhancement Act. This bill could very well remove the most contentious issues of this debate. Embryonic stem cells are pluripotent, meaning that they could potentially have a wide variety of uses. It is this quality that drives the supporters of embryonic stem cell research to their position. However, great strides have been made in deriving pluripotent stem cells from sources that do not destroy embryos.

Š. 2754 would authorize Federal funding to conduct research on the creation of nonembryonic pluripotent stem cells. If successful, we would be able to end this debate by funding a morally acceptable replacement for research involving human embryo destruction. I urge the Senate to adopt this measure.

The final bill the Senate is debating on the subject is S. 3504, the Fetus Farming Prohibition Act. I fully support passage of this legislation. This bill would ban research from fetal farms where human embryos are implanted in nonhuman uteruses. It would also ban embryos from human pregnancies created specifically for research.

Most people would find these requirements to be self-evident. However, some groups have said this is unnecessary because research already follows ethical guidelines that forbid this. That may be the case, but I believe we should take these ethical guidelines and give them the force of law to prevent the possibility of such gruesome methods ever being used by researchers. I urge my colleagues to pass this bill.

I do not like to see people with medical conditions suffer. However, I believe many advocates of embryonic stem cell research are playing on the hopes and griefs of many people whose lives are touched by illness. We are at an ethical crossroads with this issue. We must stay true to our values of respecting life. It seems foolish to stubbornly barrel ahead with Federal funding for embryonic stem cell research when, with a small bit of patience, we can put aside the moral and ethical concerns and proceed down a path we can all agree upon.

In closing, I firmly believe we cannot create life and then destroy it in order

to save another life. I urge my colleagues to vote against the Stem Cell Research Enhancement Act and to support S. 2754 and S. 3504.

Mr. President, I yield back the remainder of my time.

The PRESIDING OFFICER. The Senator from Oklahoma.

Mr. COBURN. Mr. President, I want to spend a few minutes to kind of outline some of the statements that have been made. To just show how off base from reality some of them are, we heard there was a ban on embryonic stem cell research. There is no ban on embryonic stem cell research. As a matter of fact, the American people paid \$40 million this last year on embryonic stem cell research—human, \$40 million. So there is no ban. And considering that, there is a significant industry in the private sector that is researching it.

We heard there are only 21 cell lines around, available. There are 400 cell lines available to scientists. There are 21 that Federal dollars can be spent on. So let's be real clear about what the real facts are.

We also heard from the Senator from Florida that all medical researchers believe that embryonic stem cell research is the best hope. That could not be further from the truth. All of them do not. As a matter of fact, there is a large number who do not believe that way at all, based on not ethical concerns, on scientific concerns. They think it is not an acceptable way.

We heard the Senator from Illinois saying that adult stem cells can only be collected in small quantities. That is not true at all. Many adult stem cell lines are reproductive of themselves. They are progenitor cells. They reproduce themselves. They come from amnionic membrane. They come from bone marrow. They come from endometrial lining. They come from placental tissue. They come from cord blood. They come from the spleen and the liver. They come from all sorts of areas in our body.

We heard the Senator from California say we should let the scientists decide, not the Senators. Let's talk about Tuskegee. We let the scientists decide that one. I can think of two or three more instances in the 20th century when we let the scientists decide, and we went down a path that all of us were grieved over.

When Senator SPECTER opened the debate today, there was, again, the assumption, in his first statement, that there is no embryonic fetal stem cell research. Not true. He also said none of the others have the potential of embryonic stem cell research. Well, I think there is a large body of science and a larger body of scientists who would disagree with that, especially as they study the new breakthroughs on germ cell pluripotent stem cells.

I am going to ask to have printed in the RECORD a Rand study on the available numbers of human embryos, where in fact there are 400,000. But they outline, in great detail, that the fact is, a very small percentage of those are available for fetal research. They also outline in great detail so the American public can know that for every two embryos you are going to thaw, one of those two will die during the thawing process.

So for this limited number, the most number of new cell lines, if you took all that are available today, would be less than what is available in the world today. It is 273 cell lines. So we have this great big demand, that we are going to get all this, but what we are going to get is less than what is out in the world today.

Mr. President, I ask unanimous consent that the Rand study I referred to be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

[From the Rand Law & Health Research Brief]

HOW MANY FROZEN HUMAN EMBRYOS ARE AVAILABLE FOR RESEARCH?

Frozen human embryos have recently become the focus of considerable media attention. Frozen embryos are a potential source of embryonic stem cells, which can replicate themselves and develop into specialized cells (e.g., blood cells or nerve cells). Researchers believe that such cells might be capable of growing replacement tissues that could be used to treat people suffering from a number of diseases, including cancer, Alzheimer's disease, and diabetes. Among the most contentious issues in the stem cell debate are whether frozen embryos should be used to produce stem cells for research purposes and whether it is appropriate to use federal funds for research involving human embryos.

Many of the proposed resolutions to the embryonic stem cell debate are based on assumptions about the total number of frozen human embryos in the United States and the percentage of that total that is available for research. Accurate data on these issues, however, have not been available. Guesses on the total number of embryos have ranged wildly from tens of thousands to several hundred thousand.

RAND researchers Gail L. Zellman and C. Christine Fair, together with the Society of Assisted Reproductive Technology (SART) Working Group led by David Hoffman, MD, have completed a project designed to inform the policy debate by providing accurate data on the number of frozen embryos in the United States and how many of those embryos are available for research purposes. Their findings include the following:

Nearly 400,000 embryos (fertilized eggs that have developed for six or fewer days) have been frozen and stored since the late 1970s.

Patients have designated only 2.8 percent (about 11,000 embryos) for research. The vast majority of frozen embryos are designated for future attempts at pregnancy.

From those embryos designated for research, perhaps as many as 275 stem cell lines (cell cultures suitable for further development) could be created. The actual number is likely to be much lower.

VAST MAJORITY OF FROZEN EMBRYOS ARE HELD FOR FAMILY BUILDING

The practice of freezing embryos dates back to the first infertility treatments in the mid-1980s. The process of in vitro fertilization often produces more embryos than can be used at one time. In the United States, the decision about what to do with the extra embryos rests with the patients who produced them.

The RAND-SART team designed and implemented a survey to determine the number and current disposition of embryos frozen and stored since the mid-1980s at fertility clinics in the United States and the number of those embryos designated for research. The survey was sent to all 430 assisted reproductive technology facilities in the United States, 340 of which responded. Estimates for nonresponding clinics were developed using a statistical formula based on a clinic's size and other characteristics. The results show that as of April 11, 2002, a total of 396,526 embryos have been placed in storage in the United States. This number is higher than expected; previous estimates have ranged from 30,000 to 200,000.

Although the total number of frozen embryos is large, the RAND-SART survey found that only a small percentage of these embryos have been designated for research use. As the figure illustrates, the vast majority of stored embryos (88.2 percent) are being held for family building, with just 2.8 percent of the total (11,000) designated for research. Of the remaining embryos, 2.3 percent are awaiting donation to another patient, 2.2 percent are designated to be discarded, and 4.5 percent are held in storage for other reasons, including lost contact with a patient, patient death, abandonment, and divorce.

EMBRYOS AVAILABLE FOR RESEARCH DO NOT HAVE HIGH DEVELOPMENT POTENTIAL

Although the 11,000 embryos designated for research might seem like a large number, the actual number of embryos that might be converted into stem cell lines is likely to be substantially lower. Because assisted reproductive technology clinics generally transfer the best-quality embryos to the patient during treatment cycles, the remaining embryos available to be frozen are not always of the highest quality. (High-quality embryos are those that grow at normal rates.) In addition, some of the frozen embryos have been in storage for many years, and at the time that some of those embryos were created, laboratory cultures were not as conducive to preserving embryos as they are today. Some embryos would also be lost in the freeze-andthaw process itself.

To illustrate how such laboratory conditions might limit the number of embryos available for research, the RAND-SART team performed a series of calculations. Drawing upon the few published studies in this area, they estimated that only about 65 percent of the approximately 11.000 embryos would survive the freeze-and-thaw process, resulting in 7,334 embryos. Of those, about 25 percent (1,834 embryos) would likely be able to survive the initial stages of development to the blastocyst stage (a blastocyst is an embryo that has developed for at least five days). Even fewer could be successfully converted into embryonic stem cell lines. For example, researchers at the University of Wisconsin needed 18 blastocysts to create five embryonic stem cell lines, while researchers at The Jones Institute used 40 blastocysts to create three lines.

Using a conservative estimate between the two conversion rates from blastocyst to stem cells noted above (27 percent and 7.5 percent), the research team calculated that about 275 embryonic stem cell lines could be created from the total number of embryos available for research. Even this number is probably an overestimate because it assumes that all the embryos designated for research in the United States would be used to create stem cell lines, which is highly unlikely.

The RAND-SART survey found that almost twice as many frozen embryos exist in the United States as the highest previous estimate. Only a small percentage of these embryos are available for research because the vast majority are reserved for family building. Among those that are in principle available for research, some have been in storage for more than a decade and were frozen using techniques that are less effective than those that are currently available.

Mr. COBURN. Now, why do we want multiple cell lines? It goes back to the issue I have been talking about all day. It is called tissue rejection. That is the wonder of adult stem cells and germ cell pluripotent stem cells versus embryonic. With embryonic, there is rejection because there is an allergy to the foreign tissue. It is called the HLA, histocompatibility complex. The only way around that, with fetal embryonic stem cells, is to clone yourself-the only way you will get around it. And it will only work well in women. Only if you clone yourself with your own egg do you avoid all the allergy implications of foreign tissue.

So I think it is very important that we—it is OK to have this debate, but some of the claims we hear—we actually heard, and I know he did not mean this, Senator SPECTER talking about embryos injected into the pulp of the tooth to create a new set of teeth. He did not mean embryos. He meant pluripotent stem cells. But you do not want pluripotent. What you want is the epidermal stem cells that produce teeth in the first place. That is what is great about adult stem cells. We are going to be able to do that with adult stem cells.

He also stated that embryonic stem cell research is outstripping all of the research. That is not true. It is not true at all. The vast majority of success in stem cells today lies not with embryonic stem cells, it lies with everything but embryonic stem cells.

Now, I do not deny as a scientist that would be a wonderful area in which to work. There is lots unknown, and if you are a scientist today, and they say you can go to this area where there are all these areas where you can work and go and move and everything, it is a fun area of research. But it is loaded with hazards, just like the Senator from Kansas talked about, in terms of fetal tissue. The fact is, as we may someday learn how to turn on and turn off some of these cell lines, we do not know that yet. It is fine to perfect that in animals. It is not fine to perfect that in human clinical trials until we have that absolutely controlled. I do not have any trouble with what we are doing now, doing that in the private sector.

But the question is, do we ask American taxpayers to use their money to destroy embryos—embryos for which there are 2 million people in the country who would love to adopt—do we ask them to destroy that with their tax money so we can do that research, even though it is occurring in the private sector at a far greater rate than it is in the public finance sector?

So I think this really boils down to two questions: false choices and false promises. Let me outline them. The false promise is that only embryonic stem cells are going to solve the problem. It is not true.

The second promise is we are going to get treatments, but we are not going to have to clone. You are going to have to clone if you are going to get treatments from embryonic stem cells.

No. 3 is that adult stem cells and the pluripotent lines, as well as germ cell lines, will not be able to do what embryonic stem cells do. That is not proven anywhere in the scientific literature. That is a false promise.

And No. 4 is the false promise issue that you cannot take adult stem cells and dedifferentiate, move backwards, to make them pluripotent, which we are seeing great science with an enzyme today called reversa. So those are the false promises that are out there.

Now, there are four false choices, I believe. One is that there is no cure without embryonic stem cells. That, for sure, the evidence does not show. Another is that there will not be any research unless the Government pays for it. That is not true at all. The research is ongoing across the world in lots of areas without government research, and much more so in our country outside of government research.

The third choice is that there is no life in an embryo. The fact is there is. Now, we had one Senator talk about the fact that they are going to be incinerated. If you talk about the 108 snowflake babies, the other 2 or 3 organizations that are adopting those, those children belie that fact that there is wonderful potential with the amount of demand.

I am not saying that people who disagree with me on the ethical issues are bad or immoral people. I am saying I am not fighting this on ethical issues. I am fighting this on common sense, to see what things are happening and where we are seeing success and keeping up with the science. This debate in the Senate today is almost all about a year and a half old, as far as the science is concerned. I am talking about the new science. That is why I worked so hard to stay up on it.

Finally, the promise is what every scientist knows, what everv embryologist knows and every cell biologist knows, which is the mighty mitochondria. You cannot clone without having potential rejections unless you clone yourself with your own egg. There is different DNA in the mitochondria and the cell cytoplasm. I appreciate the spirit of the debate, and I hope the American people understand that it is not a false choice of no research versus some. The question is, Do we destroy unborn children? Two, do we give Federal dollars to do that? Thank you

The PRESIDING OFFICER. The Senator from West Virginia is recognized. The Senator is to be aware that the majority controls the time until 5 p.m.

Mr. BYRD. Mr. President, I am aware of that. I ask unanimous consent that, notwithstanding and without any prej-

udice to any Senator, to speak for 5 minutes on another matter.

The PRESIDING OFFICER. Is there objection?

Mr. BYRD. Not showing an interruption at this point.

The PRESIDING OFFICER. Is there objection?

Mr. DORGAN. Mr. President, reserving the right to object, my understanding was that I would be recognized for 10 minutes following the presentation by Senator COBURN. I don't object to anything someone else wishes to do, provided that following that presentation, I am recognized for 10 minutes. Would that be part of the unanimous consent request?

Mr. BYRD. I make that part of my request.

The PRESIDING OFFICER. Is there objection?

Mr. HARKIN. If I might, as a manager, we are on strict time limits. At 5 o'clock, Senator Kennedy gets 25 minutes and then 5 minutes goes to Senator Reed. At 5:30, it goes back to the other side. If we take time here and there, it spills over, and someone is going to lose time.

Mr. KENNEDY. I will be glad to yield 5 minutes of my time to the Senator from West Virginia.

The PRESIDING OFFICER. Is there objection? Without objection, it is so ordered.

The Senator from West Virginia is recognized.

(The remarks of Mr. BYRD are printed in today's RECORD under "Morning Business".)

The PRESIDING OFFICER. Under the previous order, the Senator from North Dakota is recognized for 10 minutes.

Mr. DORGAN. Mr. President, all of us have great pride in being able to serve in this great body and the purpose of it is, of course, to be engaged in public policy debate, how to advance this country's interests. We come to this debate today on something that is very important, very controversial. This country's search in many areas—social justice, science, and so many areas of our lives—is a search that never ends. We have split the atom. We have spliced genes. We did the human genome project, developed the owner's manual for the human body. We invented plastics and radar and silicon chips, cured polio, cured smallpox, built airplanes and learned to fly them, and built rockets and walked on the moon; we invented the telephone, the computer, and the television.

It is pretty unbelievable, but this country is hardly out of breath. We continue to inquire, continue to search, and continue to ask questions. Those questions, especially in science, are, in some cases, difficult questions. We will have three pieces of legislation we will vote on tomorrow dealing with stem cell research. One piece of legislation prevents something that is not being done. I will not have any problem supporting that; preventing something

that is not being done is not posing any difficulty for me. The second piece of legislation authorizes that which is already authorized. I have no difficulty with that vote either. I will be happy to support that.

The third piece of legislation is called embryonic stem cell research. That is the basis of the controversy being discussed today. Those in this Chamber and those throughout this country who have lost loved ones to dreaded diseases understand the urgency to unlock the mysteries of these diseases. I lost a beautiful young daughter some years ago to heart disease. I wondered then, and I wonder now, and I will wonder for some long while, if there is anything that we could do to unlock the mystery of that devastating killer. But it is not just heart disease. It is diabetes, Alzheimer's, Parkinson's, cancer—the list goes on and on.

Every day, people die. Every day, there are scientists who inquire: What can be done? What can we do to unlock the mysteries to find cures for these terrible diseases?

Stem cell research. Mr. President. there are 1 million people walking on this Earth who were conceived outside of the womb in a test tube. There are 1 million living people who were conceived through in vitro fertilization. We had somebody testify before the Senate Commerce Committee a few years ago, and he said none of those people should have been born, it was wrong and in vitro fertilization should not exist. It is wrong, he said. I disagree with him. It is the blessing to provide the opportunity to have a family to so many couples who were childless through in vitro fertilization, using the egg and sperm and uniting them outside of the womb, implanting them, and providing a child for those families

At in vitro fertilization clinics, many more eggs are fertilized than are used. Some are stored and frozen. Those frozen embryos at in vitro fertilization clinics, when they are not going to be used in the future, are discarded, simply thrown into a wastebasket. They become waste and they are discarded. Some of my colleagues would say each and every one of those represents murder. I don't believe that, but some of my colleagues would insist on that position. That is murdering an embryo. We have 400,000 of those embryos stored, cryogenically frozen, at in vitro fertilization clinics. Around 8,000 to 11,000 of them a year will be simply discarded.

The question is: Should we relax the ban on Federal funding of stem cell research and allow the use of frozen embryos that otherwise are going into a wastebasket, that otherwise are going to be discarded? Should we allow the use of them with ethical boundaries and be concerned about the ethics of its use for scientific research, to try to find the cures to these terrible diseases? Should we allow that? The answer clearly is yes.

Are we comparing someone who is suffering from Parkinson's, someone who has Alzheimer's, someone with heart disease or cancer or diabetes to an embryo that is going to be discarded into a wastebasket—8,000 to 11,000 of them a year? Do we find an equivalency there

Do you believe that all of those unused fertilized eggs that are frozen at an IV clinic, an in vitro fertilization clinic, that are discarded, that each and every one represents a murder? Some believe that, I don't.

What is pro-life, I believe, what is life-giving is to be able to continue in this area of science with ethical guidelines but continue this search to unlock the mysteries of these diseases.

My colleague a moment ago said quite correctly that we don't prevent stem cell research. He is quite right about that. This issue is the restriction of Federal funding, and, of course, a substantial amount of the funding for scientific research, research in health care in this country, comes from the Federal Government.

If we take a look at what has happened with respect to the United States and the rest of the world, we will see, because President Bush has imposed restrictions on stem cell research, we have lost a substantial amount of ground to the rest of the world. We are falling far behind.

This is not about Republicans or Democrats. It is not about conservatives or liberals. Let me quote Nancy Reagan: Science has presented us with a hope called stem cell research, which may provide our scientists with answers that have so long been beyond our grasp. I just don't see how we can turn our backs on this—there are just so many diseases that can be cured, or at least helped. We have lost so much time already, and I just really can't bear to lose any more.

Nancy Reagan watched the ravages of Alzheimer's disease destroy her husband, our former President, the late Ronald Reagan. I believe she understands the urgency with which we pursue this purpose. I can read the pain in this message, and that pain exists—my guess-with so many in this Chamber and across the country who have watched loved ones die because of dread diseases that have wasted away their lives. The question is: Are we willing to do something about that? Can we do something about that? Will we retard or will we advance science? Will we hold back or will we encourage the scientists to search for these cures?

I hope the Senate will do just as the House has done and indicate that we believe that with proper ethical guidelines, stem cell research should continue with Federal funding. I believe, as I said, this is about saving lives, this is not about taking lives.

I understand that this is a sensitive subject. In fact, in my last campaign for office 2 years ago, my opponent ran television commercials saying that my position was to be supportive of planting embryos into mommies' wombs and growing them for a while and then harvesting them for body parts. That is the Byzantine nonsense which, unfortunately, attends part of this debate. No one here—certainly not me—would ever countenance anything resembling that, and yet much of the political discussion about this issue becomes so bizarre and so Byzantine that it is detached from reality.

The bill that is before the Senate that I just described—I am not talking about the first two bills, the one that prevents something that is not being done. I don't have a problem with that. Or the one that authorizes something that is already authorized, and I have no problem with that.

I am talking about the legislation dealing with stem cell research. The bipartisan coalition that brought it to the Senate includes Republicans, Democrats, conservatives, and liberals. My hope is the Senate will act on this legislation with a veto-proof majority and decide whatever the President does that we have made this decision and the decision should stick.

The PRESIDING OFFICER (Mr. ALEXANDER). The Senator's time has expired. The Senator from Massachusetts is recognized.

Mr. KENNEDY. Mr. President, I believe I am to be recognized for 20 minutes. I would like the Chair to let me know when I have 3½ minutes remaining

The PRESIDING OFFICER. The Chair will do that.

Mr. KENNEDY. Mr. President. I join my friend and colleague from North Dakota in giving special recognition to Mrs. Reagan on this issue. As someone who has been interested in this issue for some time, as many of my colleagues have, I think all of us pay tribute to her, to a very gracious, lovely, wonderful, warm First Lady and someone I admire so much because after she has been to the top of the mountain, so to speak, and entitled to a very secure and well-deserved retirement, she is still restless about this issue and tireless about talking with people and speaking about this issue with great knowledge, great awareness, great understanding, and great compassion, I mention that at this time. I think we all know this debate has moved farther down the road toward a hopeful conclusion because of her work.

Today, the Senate begins the debate on legislation unlike any other we have considered this year. Today's debate is not about economic gain or loss or helping one State or one region of the country. Today's debate is about something far more basic, something that touches the spirit of every American. Today's debate is about hope.

Hope is one of those qualities of spirit that makes us human. Hope allows us to dream of a better life for our children, our community, our world, and especially for loved ones now suffering or in pain. Hope is what stem cell research holds for the parents of children

with diabetes who dream of a day when their constant fears for their children's well-being are things of the past. Hope is what stem cell research brings to those with Parkinson's disease who long for a time when the tremors of that disease are banished forever. Hope is what stem cell research brings to millions of Americans who seek better treatments and better drugs for cancer or diabetes, spinal injury, and many other serious conditions. And hope cannot be extinguished or destroyed, but it can be delayed.

In the Bible, the Book of Proverbs tells us:

Hope deferred makes the heart sick.

And today hearts are sick almost to the breaking point because, for the last 5 years, the Bush administration has shut down the stem cell research program begun at the National Institutes of Health and imposed the arbitrary restrictions on this lifesaving research.

Hope soared anew a year ago when the House of Representatives set aside partisan differences and courageously approved legislation to end those restrictions and to give our scientists the tools they need to make the progress in the fight against disease. The vote in the House affirmed that embryonic stem cells can promote a true culture of life by enabling fuller, longer lives for millions of our citizens. The House voted for hope, for progress, and for life.

The supporters of this legislation in the Senate come from backgrounds as diverse as its proponents in the House. All of the supporters of H.R. 810, with our different backgrounds and different faiths, representing different parts of this country, have concluded that support of this legislation is the moral choice to make.

The legislation before us takes only two actions, but they hold the key to medical progress.

First, our legislation overturns the restrictions on the embryonic stem cell research imposed by Presidential order 5 years ago. That unilateral action by the administration bypassed Congress and froze progress in its tracks by barring the NIH from funding research on stem cells derived after 9 p.m. eastern daylight time, August 9, 2001—an arbitrary date and time chosen solely to coincide with a Presidential speech.

At the time the President's order was issued, it was claimed that over 60 independent stem cell colonies, or lines, would be available to NIH researchers. Initially, the NIH listed 78 such lines in its registry, but time and the unalterable facts of science have shown that two-thirds of these lines are useless or that claims about them proved to be an illusion.

Today, only 21 stem cell lines are available to NIH researchers, and all of these were obtained using out-of-date methods and outmoded techniques. Each of these 21 lines is contaminated with animal tissue because each was cultured on a so-called feeder layer of mouse cells. Techniques developed

since 2001 have allowed scientists to grow stem cells without mouse cells, but these are all off limits to NIH-funded scientists because of the administration's restrictive policy.

Even if the 21 lines were not contaminated with mouse cells, they would still be unusable for treatments. The reason is that the use of every one of these cells is constrained by a legal contract called a material transfer agreement, and each of these documents contains a clause forbidding the use of the cells in patients.

Let me be clear. If the cells in the NIH registry weren't already useless for treatment because they are contaminated, they would be useless because the contract under which they are provided forbids their use in patients.

Five years ago, we warned that imposing an arbitrary date restriction on new stem cell lines would freeze progress by denying NIH researchers access to new lines that might hold the key to medical breakthroughs, and these fears have proven well-founded.

Since the restrictions were imposed, scientists working overseas or with limited private funds have developed new lines with exceptional promise for research. For example, Dr. Douglas Melton at Harvard has derived 17 new stem cell lines with improved techniques. Scientists at the University of California have shown that stem cells can be derived without contamination from animal cells. And doctors in Israel have developed stem cell lines that have genetic traits with the potential of treating hereditary diseases, such as muscular dystrophy. These astonishing breakthroughs could lead to new cures and new understanding of these disorders, but the administration's restrictions bar NIH from supporting research to explore their promise. To unlock the healing power of stem cell research, the first action our legislation takes is to end the ban that keeps NIH from supporting research on new stem cell lines.

But science without ethics is like a ship without a compass. Strong ethical guidelines are needed to ensure that scientific progress follows the moral course that we as a society set. For this reason, the second major action our legislation takes is to establish ethical safeguards for stem cell research. And once again allowing NIH to lead stem cell research, we bring more research under the strong ethical standards that are part of every NIH grant for any kind of medical research. The bedrock principles of these standards are informed consent of the patient and approval of an ethics committee.

In addition, when it comes to stem cell research, our legislation requires NIH to go beyond these general requirements and requires NIH to issue specific standards for stem cell research. Before the NIH stem cell research program was terminated in the early days of the Bush administration,

it had developed an extensive and robust ethical framework for the research. These requirements include an extra level of review to assure that all research was conducted according to special protections applicable to stem cell research. They limit research only to cells derived from embryos from fertility clinics that were never to be used to initiate a pregnancy and were likely to be discarded. They prohibit payment for donation of cells. They forbid improper inducements to donate embryos to further ensure that all cells used for research must come from embryos that would not be used to initiate a pregnancy.

I want to take a moment to discuss this last point in detail. Even with the intense debate on stem cells over the last 5 years, there remains some confusion about the source of stem cells. The cells are not derived from fetuses, they are not from embryos that might otherwise have been used to start a pregnancy.

Our legislation explicitly requires the stem cells to be derived:

From human embryos that have been donated from in vitro fertilization clinics, were created for the purpose of fertility treatment, and were in excess of the clinical need of the individuals seeking such treatment.

Those are the words, Mr. President.

In fertility clinics around the country, there are thousands of embryos that are simply thrown away. Hundreds of thousands more are frozen and never used. They are not the result of a pregnancy; they are not the product of an abortion or a miscarriage. The only way they can produce life is to be implanted in a woman, and these embryos we propose to save for research have not been and will not be. We believe it is better to save embryos that would otherwise be destroyed so they can give the gift of life to patients who are suffering. Life is too precious to allow an opportunity to cure illness to be simply thrown away.

Some say this debate is only about science, and that it is not a moral choice. I disagree. A vote on this bill involves a deeply moral choice. It is a choice between making progress toward better treatment for patients or spurning a chance for new cures. There are deeply moral people on both sides of this debate, but I am convinced that medical progress is the right one.

We have faced similar choices many times in the past. In the 1970s, Congress was considering whether to ban research on recombinant DNA—the very foundation of biotechnology. Then, as now, some raised ethical concerns or dismissed the promise of this research as a pipedream, and urged Congress to forbid it. In the 1980s, Congress made the right choice by rejecting attempts to outlaw IVF, a technique that has fulfilled the hopes and dreams of thousands of parents who never would have been able to have a child otherwise.

Other forms of medical progress brought similar controversy: transplantation, blood transfusion, even vaccines. All of these breakthroughs were once new and controversial, with strong voices raised against them. All were discussed and debated and eventually adopted in ways that are consistent with American values. Each time we looked to the future and saw the potential of controversial research, we chose progress, and the benefits have been immense.

We should make the same choice on stem cell research. We should not allow the misplaced fears of today to deny patients the cures of tomorrow.

Some argue that we should support research on adult stem cells, or stem cells from umbilical cords, or stem cells derived from using new genetic techniques. I agree. We should leave no stone unturned in the search for new cures. Perhaps some cures will come from one technique and other breakthroughs from another. Let's encourage our scientists to explore every avenue that is ethical and could lead to progress. But there is no sense in closing the door on one of the most promising areas of medical research discovered in decades, while we wait for other, less hopeful methods to show success or failure. That is not my assessment; it is the judgment of every major scientific leader in America.

According to a letter by 80 Nobel laureates:

For disorders that prove not to be treatable with adult stem cells, impeding human pluripotent stem cell research risks unnecessary delay for millions of patients who may die or endure needless suffering while the effectiveness of adult stem cells is evaluated.

The Institute of Medicine was just as clear on the need for embryonic stem cell research:

Embryonic stem cells studied in animals clearly are capable of developing into multiple tissues and capable of long-term self-renewal in culture, features that have not yet been demonstrated with many adult stem cells.

In a letter to the Senate Appropriations Committee, Dr. Elias Zerhouni, the Director of the NIH, said:

It is clear that more cell lines would be helpful in ensuring expeditious progress in this important field of science.

His conclusions were echoed by other NIH Institute Directors such as Dr. Elizabeth Nabel, head of the NIH Institute on Heart, Lung and Blood Disorders, who said:

The limitations of existing cell lines are hindering scientific progress among a community that is very eager to move forward in this promising area.

The judgment of the Nation's scientific leaders could not be clearer or more emphatic: Yes, we should study adult stem cells, but we should let science decide which approach works best for patients.

But in the end, this debate is not about abstract principles or complex terms of science. It is about people who look with hope to stem cell research to help them with the challenges they face.

Two years ago, I held a forum in Boston on the promise of stem cell re-

search. One of the participants was Moira McCarthy Stanford from Plymouth, MA, whose 14-year-old daughter Lauren has juvenile diabetes. I wish to end my remarks today with a letter that Lauren wrote to me. It explains far more eloquently than any Senator could the urgent need to pass this legislation. These are Lauren's words:

For as long as I can remember, I have had to take a lot of leaps of faith. I have had to believe my parents when they told me taking four or five shots a day and pricking my finger eight or more times a day was just a new kind of normal. I had to—

The PRESIDING OFFICER. The Senator has  $3\frac{1}{2}$  minutes remaining.

Mr. KENNEDY. I thank the Presiding Officer.

I had to just smile and say I'm fine when a high blood sugar or a low blood sugar forced me to the sidelines in a big soccer game, or into the base lodge on a perfect ski day, or out at the pool during a swim meet.

But when I watched, with my parents, President Bush's decision on stem cell research in the summer of 2001, I just could not accept it. You see, the one thing that has helped me accept all I have had to accept these years is the presence of hope. Hope keeps me going.

That night, President Bush talked about

That night, President Bush talked about protecting the innocent. I wondered then: What about me? I am truly innocent in this situation. I did nothing to bring my diabetes on. There is nothing I can do to make it any better. All I can do is hope for a research breakthrough and keep living the difficult, demanding life of a child with diabetes until the breakthrough comes. How, I ask my parents, is it more important to throw discarded embryos into the trash than it is to let them be used to hopefully save my life.

I am so happy to hear that the Senate is thinking of passing H.R. 810. I can dream again—dream of that great day when I write a thank you letter to the Senate, to the House, and everyone who helped me become just another girl; a girl who dreamed and hoped and one day, got just what she wanted: her health and her future. That's all I'm really asking for.

Those are Lauren's words, and they command us to act. Tomorrow, we must cast a vote of conscience and of courage. We must reaffirm that our common value of bringing hope to those who need it outweighs any single ideology. We must approve the Stem Cell Research Enhancement Act, and we must call upon the President of the United States not to veto hope.

I thank the Chair.

Mr. REED. Mr. President, I believe I have 5 minutes under the order.

The PRESIDING OFFICER. The minority controls the time until 5:30.

Mr. REED. Mr. President, I yield myself 5 minutes.

I wish to take a few moments talking about H.R. 810, the Stem Cell Research Enhancement Act. Last year, the House overwhelmingly passed this bill, and I am pleased that the Senate will now finally consider this legislation. My colleague in the other body, Congressman JIM LANGEVIN, has been a staunch advocate for stem cell research and has played a central role in advancing this legislation through the House of Representatives, and I commend him for that.

I hope to be able to stand on the Senate floor a few years from now to highlight the advancements that have been made in the treatment of spinal cord victims, children with diabetes, and Parkinson's treatment because of embryonic stem cell research. However, I fear that even if the Senate approves legislation, patients will only see further delays in promising stem cell research.

The President endorsed the use of Federal funds research on existing cell lines in his August 2001 Executive Order. At the time of the announcement, he said:

Scientists believe further research using stem cells offers great promise that could help improve the lives of those who suffer from many terrible diseases—from juvenile diabetes to Alzheimer's, from Parkinson's to spinal cord injuries. And while scientists admit they are not yet certain, they believe stem cells derived from embryos have unique potential.

This is from the President's Executive Order.

We know now that the stem cell lines identified in the Executive Order were not the panacea for breakthrough medical research. There are only 22 stem cell lines available for federally funded research, and since they were derived in the absence of scientific and ethical guidelines, they have proven unsuitable for most research. At the same time, there are approximately 400,000 frozen embryos in IVF clinics that will likely be destroyed. While I recognize the many benefits of using embryonic stem cells in biomedical research, I also realize that many serious ethical and moral issues have to be considered. I believe Federal guidelines designed to create and uphold strict oversight of these practices can achieve the appropriate balance needed in order to ensure that this research is being carried out in an acceptable manner.

H.R. 810 sets forth responsible rules and limitations for obtaining excess embryos as well as adequate standards for conducting research involving embryonic stem cells. It would establish the necessary framework for oversight so that principled research can finally be allowed to proceed.

Some of my colleagues believe embryonic stem cell research is not necessary, given some of the tremendous advances adult stem cells have yielded. Indeed, I wholeheartedly support continued progress in the area of adult stem cell research and was proud to be one of the lead sponsors of the Stem Cell Therapeutic and Research Act, which Congress enacted late last year. This bill was essential in maintaining patient access to lifesaving treatments through the National Marrow Donor program and also opening the door to the developments of a companion registry system for cord blood.

We know the use of umbilical cord blood in treating diseases such as leukemia, sickle cell anemia, and rare but deadly genetic disorders such as Krabbe disease is showing tremendous promise. The Stem Cell Therapeutic and Research Act solidified the Nation's commitment to increasing the number of cord blood transplants by providing additional Federal funds to help public cord blood banks increase their inventory, as well as support outreach, patient advocacy, and coordinating information and education activities.

The President also recognized the importance of this avenue of research. During the 2001 Executive Order, he said:

You should also know that stem cells can be derived from sources other than embryos. And many scientists feel research on these types of stem cells are also promising. Many patients suffering from a range of diseases are already being helped with treatment developed from adult stem cells.

He went on to add:

However, most scientists, at least today, believe that research on embryonic stem cells offer the most promise because these cells have the potential to develop from all of the tissues of the body.

Those are the President's words. I urge all of us to heed those words today.

I urge the Senate to support H.R. 810 and also the President to sign it into law. I also intend to support S. 3504 and S. 2754, but neither of these measures is a substitute for H.R. 810.

Mr. President, I yield the floor, and I note the absence of a quorum.

The PRESIDING OFFICER. The clerk will call the roll.

The legislative clerk proceeded to call the roll.

Mr. ISAKSON. Mr. President, I ask unanimous consent that the order for the quorum call be rescinded.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. ISAKSON. Mr. President, I rise to take advantage of the time assigned or allotted for all of us to discuss what is obviously a passionate, controversial, and important issue. But I rise to talk about it from, probably, a different perspective than some of the other speeches—at least those I have heard. I want to talk prospectively, about what happens after this debate is over.

If all the predictions come true, at the end of the day we will not debate stem cells for the rest of this year because the agreement to bring it to the floor was that we come to the floor, we debate these three bills, and the debate would be over for the year.

The debate will not be over. In fact, if anything, this is probably the beginning of a long debate as we deal with the ethics and the morality and the hope and the promise of science as it relates to stem cells—in particular, embryonic stem cells.

When the President issued his order in August of 2001, I supported it because it invested in embryonic stem cell research and it clearly drew the line in terms of how far we would go. I have been supportive of the President's policies on embryonic stem cell research since.

When H.R. 810 passed, I began to do what I think all of us should do. I began to get educated as best I could on this controversial and important issue. Dr. Michael Johns at Emory University helped me. Dr. Steven Stice, at the University of Georgia, helped me. I sat through more than a few demonstrations—not sales presentations but demonstrations of programs and efforts in embryonic stem cell research underway, under NIH guidelines, and were moving forward.

I learned a lot. I learned this promise of embryonic stem cells was uncovered or identified in 1998. Research has been done for 8 years. They hold great promise. Adult stem cells have been around longer and have demonstrated promise beyond what embryonic has today, but that is because of the time and the amount of money that has been invested.

But I learned one thing. I am not smart enough to know what the end result of all this research will be, but I am smart enough to know that our country must continue to be a player in the research. Everywhere NIH is involved, you have standards, you have ethics, you have procedures, and you have protocols. It is very important that all those exist in such a delicate and important type of research. We must be respectful of human life.

The proposal in H.R. 810 that is of concern is that it involves the destruction of an embryo that, if implanted, could become a human being. That is a legitimate concern for us as a country to have

When Senator FRIST began fielding inquiries with regard to this issue, months ago, after H.R. 810 passed the House, I engaged myself as I was in this learning process in hopes of finding a prospect where we could match the standards of ethics we all want and also invest in the hope for the future. I believed that there was a way—in fact, there is a way—that we could invest in embryonic stem cell research without involving the destruction of an embryo that could be transferable to the womb and become a fetus.

For a second, I wish to discuss that on the floor simply, if nothing else, to point out that there are many opportunities of hope out there that meet both the ethical and the moral as well as the scientific desire that I think a consensus of this body has.

Dr. Steven Stice is a noted researcher at the University of Georgia. I had the privilege of meeting him last year. I have three times been to his clinic at the university. Dr. Steven Stice is a man who understands the concern over the ethics of the destruction of a viable embryo. So in the development of embryonic lines BG01, 2, and 3, which were developed prior to August of 2001 and are in operation at the University of Georgia today, those stem cell lines were derived from the byproducts of in vitro fertilization that could not be implanted and could not be frozen.

My point to you, the Presiding Officer, and the ladies and gentlemen of the Senate, is this: There are three lines that exist today that were derived from the byproducts of in vitro fertilization that could not be implanted in the womb and become a fetus or be frozen for subsequent implantation. Under the Guarder et al. principles in the grading of material in in vitro fertilization, there is a clear line of that which is viable, that which can be frozen, and that which cannot. It doesn't involve the discarding of anything that can be viable, but it does lend hope that from sources other than the viable embryos, stem cells can be derived.

I respect human life and I want us, as a nation, to always be respectful and never disrespectful of it and its potential. I also respect the wonder of science in innovation and the great discoveries that it has brought. I stand here today believing that you can do both and that as we move forward, beyond this debate, beyond a veto if it takes place—whatever the fire and substance is—we should start tomorrow looking at these other alternatives. Just in the 18 months since this issue began to bubble up in the Senate, there have been breakthroughs, such as single cell extraction from embryos without the destruction of the embryosomething that holds great promise for those cells to actually replicate themselves into stem cells.

We can do it. It is important that we stay on course to do it. But it is important that we not break the ethical principles to which we are committed and always be respectful of life.

In the course of the negotiations with the leader—and I want to inject something here with regard to Majority Leader FRIST. I don't know anybody who has ever been dealt a tougher hand in terms of coming to a resolution of these issues. I thank him for the amount of input he let me have. Unfortunately, I was unsuccessful in being a part of the final debate, in terms of what I just described, in terms of the stem cell lines they are operating on at the University of Georgia, but I think under the circumstances he did the best he could.

Sincerely I stand here as a Member of the Senate with 4 years remaining in my term, knowing that we will revisit this issue time and again. As science changes and moves forward, there will be ways we can embrace, ethically and rightfully, research that holds hope and promise for those who suffer and those who are afflicted.

My last comment is this. I was a real estate broker in my private life, before I came to Congress. I am not a doctor and I am not a scientist. I have heard some declaratory statements on the floor about what research will and will not prove in the future. I didn't just fall off a turnip truck. You do research to determine what you are going to find out, not just to predict what it will or will not do.

As we go through this difficult, tenuous debate over a subject of immense importance to the American people, let's look for ways that we can be respectful of human life and open the doors for the furtherance of development in science in embryonic stem cells. I submit there are ways to do both, and I will be here to work with the leader, with my colleagues, and with our President to unlock those doors so that promise and hope exists and we never breach the ethical divide that caused the debate today.

I yield the remainder of my time and suggest the absence of a quorum.

The PRESIDING OFFICER. The clerk will call the roll.

The legislative clerk proceeded to call the roll.

Mr. BROWNBACK. Mr. President, I ask unanimous consent that the order for the quorum call be rescinded.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. BROWNBACK. Mr. President, I see the next speaker is here, and I yield the floor.

The PRESIDING OFFICER. The Senator from Maine is recognized.

Ms. SNOWE. Mr. President, I rise today to speak to an issue of tremendous significance to countless Americans and to generations to come—the matter of stem cell research. I thank the majority leader for his tireless efforts to ensure consideration of stem cell legislation. The bottom line is, there is research we could be conducting today that could help us treat—and in some cases cure—some of our most serious diseases. That is why two-thirds of Americans favor embryonic stem cell research and why I have cosponsored H.R. 810, the Stem Cell Research Enhancement Act.

The promise of stem cell legislation lies in the simple fact that embryonic stem cells have the unique potential to develop into any of the cells which could be needed to treat the multitude of diseases from which Americans suffer. The vast potential of stem cell therapy is key to many future therapy because in so many diseases, cells are lost and their function is often irreplaceable. Stem cells offer an opportunity to actually replace cells which are lost.

Consider today that 20 million Americans live with diabetes. Despite treatment with drugs and insulin, many experience vision loss, injury to extremities, heart disease and other complications. For years, scientists have sought to find a cure. And today stem cells offer that potential to end dependence on insulin, freeing millions from diabetes

In many diseases, there simply is not even a therapy to replace the function of lost cells. Brain disorders such as Parkinson's disease, ALS or "Lou Gehrig's disease," and Alzheimer's disease have only limited treatment options available. We simply cannot replace the function which is lost. But with new therapies derived from stem cells, we could see major breakthroughs in avoiding the terrible toll that millions now experience.

Today the Senate is considering three bills. The first of these, the Fetus Farming Prohibition Act, certainly addresses an issue about which I expect there is no disagreement in the Senate. No embryo should ever be conceived for the purpose of producing stem cells. That is not at issue. Nor does any reputable scientist desire to work with human tissue produced in an animal. These prohibitions are not controversial and I believe my colleagues will join me in supporting them.

In fact, 1 year ago this week, I joined with Senators FEINSTEIN, SPECTER, HATCH, and others to introduce the Human Cloning Ban Act to make indisputably clear another prohibition—that no human would be cloned. Nor is stem cell research about conducting research on embryos.

I do share with the majority leader the concern that we address the highest levels of ethical standards, and I have great confidence that with the Federal Government playing a role in this research, we can bring such standards to bear.

This is essential—that the Federal Government be constructively engaged.

The second piece of legislation concerns stem cell research already supported by the Federal Government. My colleague, Senator SANTORUM, has introduced legislation—the Alternative Pluripotent Stem Cell Therapies Enhancement Act, S. 2754—to promote the use of "alternative stem cells." These are typically "adult stem cells." These cells are already partly specialized, and have the potential to develop into several kinds of cells. Yet they are not the same as embryonic stem cells, which can develop into potentially any kind of tissue. So their use is limited. Cord blood stem cells are an example of this type of cell, and they have certainly proven useful in treating some diseases.

I must note that no obstacles currently exist to the kind of research the Santorum bill addresses. Clearly, adult stem cells have potential, and certainly research on them should continue to be pursued. Yet by passing this bill we do not open any new avenues to our scientists. In fact, we can make them take a detour. This is why.

We know that in order to use embryonic stem cells to make cells which can be used to treat a disease—like diabetes—scientists must learn how to make the cell become the right type.

But an adult stem cell is actually already somewhat specialized, so one could not use them to produce many of the types of cells we need to produce new therapies. Essentially, one would have to take such a stem cell and reverse its development back to an embryonic stage and then begin the task to develop it into the specialized cell required. It is as if you were driving down an interstate on a trip, took an exit, made a few turns, and then decided to back up in reverse all the way to the interstate in an attempt to try another destination. This is not the way to get where you are going.

So while adult stem cells have promise—they certainly are not comparable to an embryonic cell—with its potential to become any type of cell in the body. And even if you could turn an adult stem cell into an embryonic stem cell—you have simply doubled the obstacles and work required to reach your destination—which is a cure. That means millions of lives lost as you pursue a convoluted course. . . .when embryonic stem cells provide a far more direct path to creating cures.

That is why I am a sponsor of the Stem Cell Research Enhancement Act—H.R. 810—the third bill on which we will vote. Remember that we shared hope for progress back in August of 2001 when the President declared research could utilize the stem cell lines then in existence. Yet scientists have found that many of the cells were contaminated or otherwise unusable. In part we know that even when a stem cell line is created, it cannot reproduce indefinitely. So we must address how we may obtain additional cell lines for medical research.

I thank Senators SPECTER and HAR-KIN, and Representatives Castle and DEGETTE for joining together to work to address the fundamental question of federal participation in embryonic stem cell research. The legislation which they produced sets a very constrained set of circumstances under which embryonic stems cells may be obtained in order to assure we can move this vital research forward within an ethical framework. Never will an embryo be created for research purposes, nor does this legislation facilitate such studies. The act assures that an embryo may be used only when it would not ever be used for infertility treatment. Donation must be voluntary, under full informed consent and no financial or other inducement may be given.

The fact is that fertility treatment has allowed many to have families whom otherwise could not. A consequence of this remarkable therapy is that some embryos are created which will not be used. I must note that under the Stem Cell Research Enhancement Act, it will be the couple who will—under no bias—decide whether they will be used. This legislation facilitates that donation.

Today Americans who have faced fertility problems are facing the question of what to do with unused embryos. Indefinite storage is not truly an option—we know that we cannot maintain the viability of these embryos indefinitely. So given the choices available, some couples see the potential to help those suffering from serious disease. It assures that this gift can be given and used to help medical progress.

I believe many Americans who have undergone fertility treatment and realized a gift of life in their families will opt to save lives through a donation which promises to save many lives. But it must always be individual conscience that is the determinative factor—and I respect the views and conscience of each and every individual on this matter.

There can be no doubt that stem cell research will move forward. The real question is whether our Nation will be engaged . . . whether our scientists will realize the breakthroughs . . . whether we will produce the treatments. Or whether those developments will draw our best minds and new medical investment abroad, where American vision and oversight will not influence the future of medicine.

I believe in stem cell research. More than 70 percent of the American people believe in stem cell research. I believe in it because I cannot look at a person suffering from a debilitating, and even fatal disease and support prohibitions which impede ethical research aimed at alleviating of that suffering. That is why I joined with my colleagues in the Senate in urging President Bush to ease the current restrictions on the use of stem cells so that research can move forward and lives could be saved. That is why I am a sponsor of the Senate version of this legislation introduced by Senators Specter and Harkin. It is why I urge my colleagues to give that bill their support. This is the bill which will make a difference. I urge the President to reconsider this issue, and urge his support. Hopefully he will not veto this legislation because ultimately the alternative is to accept the status quo. The status quo is not right for those suffering from these diseases and for future generations who will.

I think back to President Reagan's passing 2 years ago, and remember the outpouring of concern we all had for our former President, and the First Lady and their entire family. We spoke much of the tragedy of Alzheimer's Disease and how we must do more to alleviate the suffering. Nancy Reagan inspired us all with her courage-and inspires us no less in her call for research which could alleviate the suffering from so many diseases. Her recent words call out to us. "A lot of time is being wasted . . . A lot of people who could be helped are not being helped."

I cannot think of a more significant living memorial to our former President than to allow more research to be done in order to find new cures for diseases affecting millions of people.

Today I ask my colleagues to consider allowing individuals—who have through modern medical science, enjoyed a gift of life, to contribute to saving other lives. That is exactly what H.R. 810 does, and that is why we must send this bill to the President and he must sign it.

The PRESIDING OFFICER. The Senator from Kansas is recognized.

Mr. BROWNBACK. Mr. President, how much time remains on our side?

The PRESIDING OFFICER. There is 8 minutes 30 seconds

Mr. BROWNBACK. Thank you very much.

I want to point out in a little different format to my colleagues that when we talk about direct areas of being able to get treatments—we covered this some today—this is a little bit of a different presentation and a little more directly related to where we are getting treatments in this field, which is in the adult stem cell field. Here are some of the various areas where we get direct treatments.

The area of embryonic research, while interesting and intriguing, is not producing any results. It is not producing any cures. We are getting direct results from the adult, and we are not getting the formation of tumors in the adults. This area is working.

I also point out this is at no cost. People say these are embryos and we are throwing them away. You look at that. And I had this morning in my office and at a press conference three snowflake babies. These are all babies who were in in vitro fertilization clinics, were not going to be implanted by the natural parents, were given up for adoption. They are here now, and they are beautiful and they are wonderful. They are absolutely precious.

This isn't some sort of throwaway commodity. I point out to people that if you are one of those individuals who have frozen embryos—the number I hear is that 1 in 10 people in the United States suffer from infertility problems. There are a lot of people who would want to and do want to implant these frozen embryos and give them the nurturing they need to become humans we would all recognize. I hope people will look at that.

My other point is on President Reagan, who certainly was an inspiration for me to get into public office, and had a beautiful winsomeness about his presentation of truth. He was a fabulous individual. President Reagan was pro life. President Reagan did not and would not agree with the destruction of young human life. In fact, he said at one point in time, if there is a doubt about whether it is a life, if somebody was dying and there was a doubt about whether they are dead, you wouldn't put them in a casket and bury them. You would give them the benefit of the doubt. You would say, Well, let us work to bring them back.

The same on the young end—if there is a question, you err on the side of life. You treat this as life. There is a kind of common sense about it.

President Reagan was pro life. He fought for pro-life issues. He would not want to see us destroy one human life for the benefit of another.

A final point in this area: President Reagan suffered Alzheimer's disease. Alzheimer's is, as I understand it being explained to me, a plaque disease on the brain material. It is highly unlikely it is going to be treated with stem cells. Parkinson's is an area where we have adult stem cell treatment—a different type of disease. But the disease President Reagan fell to was Alzheimer's. It is highly unlikely

that any stem cell, even adult or cord blood, and even more unlikely embryonic or cloning, would deal with the area of Alzheimer's.

The only reason I mention that is I think we need to try to be very accurate in our debate in saying what is a good possibility and hope and what is not. That one would be unlikely. Parkinson's we have a good shot at in the adult stem cell, and we have some early treatments already showing some promise in that particular field. But I don't think it is wise that we bring that up in that particular instance in the case of Alzheimer's. I think it is important that we be very clear about what this is and what will work and what will not.

The other thing I want to make mention of when we are talking about cures for things in this field is let us talk about areas where we have real scientific prospects of getting this done in the adult field. In the embryonic, as we have said for some period of time, it is unlikely to produce any sort of direct benefit to patients any time in the near future. That is according to scientists who are pro embryonic stem cell research. We can do more research in this field. There is some understanding from the presentation of the Senator from Georgia talking about other areas to derive embryonic type of stem cells. That is something we can do. The scientific community is producing more and more results in that particular area which I think are quite helpful and quite promising for us. It removes the ethical dilemma on this. It would be deriving embryonic type stem cells but without destroying embrvos.

We are coming up with this along with the stem cell line. People are coming up with this in other fields. There is no reason to go into the ethical area—the question of destroying human life with taxpayer dollars to be able to get that done. I think it is important that we point out those particular areas in this bioethical debate.

One of the bills we will be voting on is an alternative bill. I talked about the fetal farming bill. I hope that passes 100 to zero so we can ban fetal farming. A lot has been talked about on H.R. 810, which is expansion of the stem cell lines using embryos and Federal taxpayer dollars to do that.

What has been talked about less is this area of the Santorum-Specter bill which would create embryonic type stem cells without destroying embryos. Here is a way for people, if they are troubled about the ethics of destroying a young human—I really do not want to do that, but you think there is a promising area of inquiry on these embryonic type stem cells and you are looking at this saying, Yes, it is not producing cures or results right now, but it might in a decade or two, so I would like to see this pursued—here is an ethical alternative for you to pursue. You don't have to say, Let's destroy this young human life. You can

say, Let us go with the alternative here where we are finding scientifically that we can derive these types of stem cells without the destruction of human life, embryos. If you like this field of inquiry, I raise a question about embryonic stem cells because we have invested \$.5 billion in animal and human. We don't have any applications for it today, but if you are still saying we still ought to invest in this field because it might produce something, it might produce something big, you have an alternative which you can vote for in this Santorum-Specter alternative bill, and say, We want to pursue the science in this particular field. That is an area and a possibility that could work and we can and should, I think, pursue. I think it would be a good alternative for somebody who is in that type of quandary about which way to pursue this.

I will have further comments later on this evening. I don't want to take up the other side's time. I yield the floor. I suggest the absence of a quorum.

The PRESIDING OFFICER. The clerk will call the roll.

The legislative clerk proceeded to call the roll.

Mr. HARKIN. Mr. President, I ask unanimous consent that the order for the quorum call be rescinded.

The PRESIDING OFFICER (Mr. ISAKSON). Without objection, it is so ordered.

Mr. HARKIN. Mr. President, we are awaiting the arrival of a Senator on our side to speak on the stem cell issues. Until that happens, I will take a couple of minutes to talk about something my friend from Kansas brought up earlier today about adult stem cell treatments.

I am reading a letter from Science express, a publication of Science magazine. It is entitled, "Adult Stem Cell Treatments for Diseases?"

Opponents of research with embryonic stem (ES) cells often claim that adult stem cells provide treatments for 65 human illnesses. The apparent origin of those claims is a list created by David A. prentice, an employee of the Family Research Council who advises U.S. Senator Sam Brownback (R–KS) and other opponents of ES cell research.

Prentice has said, "Adult stem cells have now helped patients with at least 65 different human diseases. It's real help for real patients". On 4 May, Senator Brownback stated, "I ask unanimous consent to have printed in the Record the listing of 69 different human illnesses being treated by adult and cord blood stem cells". In fact, adult stem cell treatments fully

In fact, adult stem cell treatments fully tested in all required phases of clinical trials and approved by the U.S. Food and Drug Administration are available to treat only nine of the conditions on the Prentice list, not 65.

Again, it exposed most of these as kind of being bogus. One of those listed was testicular cancer. Testicular cancer is not being treated with adult stem cells, at least not successfully. In fact, according to the Sciencexpress article, the study that is supposed to be the basis for that claim is actually a study on how to isolate adult stem cells.

The Senator from Kansas also has a list that included several leukemias and lymphomas. Let's hear what George Dahlman of the Leukemia and Lymphoma Society has to say about that

On behalf of the Leukemia & Lymphoma Society, I am writing in response to assertions that adult stem cells have treated or cured several blood cancers, including several leukemias, lymphomas and multiple myeloma.

As a representative of more than 700,000 patients and their caregivers in this country that battle blood cancers on a daily basis, our organization would like to emphasize as the Senate debates H.R. 810, the Stem Cell Research and Enhancement Act, that we exist today because we have not found cures for these devastating diseases. Furthermore, the claim that treatment of blood cancers with cord blood, blood or marrow stem cells—known as hematopoietic stem cells—demonstrates the potential of 'adult stem cell' research or is a substitute for embryonic stem cell research is misleading and disingenuous.

Mr. Dahlman concludes:

The Leukemia & Lymphoma Society asks that you and your colleagues pass H.R. 810, and not accept any substitutes.

All in all, according to the science journal, only nine diseases of the 65 examined have proved to even respond to treatment with adult stem cells.

The authors of the analysis conclude that claims about stem cells being in general use for 65 diseases are false. Such claims "mislead lay people and cruelly deceive patients."

Again, we are going to hear a lot of talk about all we can do other than embryonic stem cell research. This should not be a debate about whether we do adult stem cells, cord blood, or all these other things. They are all worthy of research.

Those that are for adult stem cell research, cord blood, bone marrow research, that type of thing, all say they want to do that to the exclusion of embryonic stem cells. Those who are in support of H.R. 810 say let's do them all and do them all in an ethically acceptable manner.

Again, we have strong ethical guidelines. One, we do not create any embryos with this bill. You can only use the embryos that are already existing in IVF clinics that are left over that will be discarded. Second, we must have written informed consent of the donors. Third, no one can get paid; no money can change hands. You cannot entice someone to donate these embryos with money. We have strong ethical guidelines.

Lastly, I have heard comments today time and time again about how this bill, H.R. 810, involves the destruction of embryos. I challenge anyone to show me where in H.R. 810 it provides for the destruction of any embryos. Under the Dickey-Wicker amendment that is now existing, no Federal funds can be used to destroy embryos. All H.R. 810 says is that once stem cells are derived through private means or whatever, then Federal funds can be used to go to universities or to other researchers to study these embryonic stem cells.

There is nothing in this bill, and I challenge anyone to show me in H.R. 810 where it provides for the destruction of any embryos; it does not. To say otherwise is being disingenuous. The Dickey-Wicker amendment still applies. No Federal money can be used for the destruction of embryos, plain and simple.

I see my colleague from Illinois is here. I yield the floor.

Mr. DURBIN. I thank the Senator from Iowa not only for yielding but also for being the leader on our side of the aisle on this issue, with Senator SPECTER on the Republican side. I am glad this day has finally come. This matter has been on the calendar for over a year.

For over a year, millions of Americans have been wondering when the Senate will take this up. Finally, it has been scheduled. A lot of people outside this Chamber had a lot to do with it being scheduled. First Lady Nancy Reagan stood up and spoke up when she saw the late President suffering from Alzheimer's. Her voice has made a difference. I salute her for that. Christopher and Dana Reeve, both gone now, in their lifetime, the dedication and energy they put on this issue made all the difference in the world.

There are three votes tomorrow. There is only one that gets to the heart of the issue. There are some that are going to address a lot of different issues from different perspectives, but there is only one that counts when it comes to stem cell research. The Stem Cell Research Enhancement Act is the only bill that expands Federal funding for embryonic stem cell research, the type that holds out so much promise.

The other two bills are well intentioned. I am not going to say anything negative about them. I will vote for them because, frankly, they make little or no difference. One of them bans practices that presently are not being used. I guess that is a good thing to do. I will vote for that bill.

The other one, by Senator Santorum of Pennsylvania, won't accomplish much. This was the question I asked of Dr. James Battey of the National Institutes of Health about the Santorum bill: Can you tell me whether S. 2754 authorizes research on stem cells at the NIH that currently is not permissible or legal?

He answered: No, it does not.

So it does not give new authority to NIH, and it does not expand research. It has some motive other than medical for being offered.

William Neaves, a leading stem cell researcher, has it right:

This is not a contest between adult stem cells and embryonic stem cells. Instead, it is a contest between society and disease.

I have listened to some of the arguments in the Senate. Some of the arguments are that adult stem cell research has great potential. I believe that is true. I believe we should pursue it aggressively. However, the argument seems to be that if that is the case,

then we do not have to concern ourselves with embryonic stem cell research.

I am a liberal arts lawyer and do not profess to know about medical research, but why foreclose a whole area of research with embryonic stem cells that the greatest minds in America tell us is so promising? Why wouldn't we do both, both adult stem cell research, as well as embryonic stem cell research? From that point of view, I cannot follow the logic in opposing this bill.

Former Senator John Danforth is another person who has thought about this issue. I respect him a lot. He is an ordained Episcopal minister and a longtime opponent of abortion. Like tens of millions of Americans, he comes from a family that knows the pain of disease. He lost one of his brothers to Lou Gehrig's disease. He wrote this in the St. Louis-Post Dispatch:

A choice between two understandings of human life. On one hand, we have millions of people who suffer from ALS, Alzheimer's, juvenile diabetes, Parkinson's, spinal cord injuries and cancer—and the loved ones who care for them and suffer by their sides. On the other hand, we have tiny bundles of unfertilized cells existing in petri dishes.

He went on to write, the people who oppose stem cell research:

should explain to the afflicted and their loved ones why they care more about those cell bundles than they do about the people.

This Stem Cell Research Enhancement Act has been supported by so many groups. I ask unanimous consent, Mr. President, to have the names of some of those groups printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

### WHO SUPPORTS H.R. 810

The Stem Cell Research Enhancement Act is supported by more than 200 patient groups, scientists and medical research groups. They include: American Medical Association, American Association for Cancer, American Diabetes Association, Juvenile Diabetes Foundation, American Pediatric Society, March of Dimes, the ALS Association, Parkinsons Action Network, Alzheimer's Association, Parent Project Muscular Dystrophy, Kidney Cancer Association, Coalition for Pulmonary Fibrosis, and the Society for Neuroscience Research.

Mr. DURBIN. I would say that all of the big names in medical research in America support this bill. They understand this is the real deal. This is the bill that will make a difference. The other two may not.

Among the other groups supporting the Stem Cell Research Enhancement Act are the Republican Main Street Partnership, the B'nai B'rith International, and a long list of people representing religious organizations from almost every denomination in Amer-

Why do we need this? We need it because President Bush decided in 2001 to take a position on medical research. I do not think there is a precedent in American history for what he did. He

basically said we were going to cut off Federal funding for those who were involved in embryonic stem cell research, except for a limited number of lines. He identified 78 stem cell lines on the day of his speech and said that scientists who received any Federal funding at all could work only on those stem cell lines

As Senator HARKIN has pointed out over and over, not only were the 78 lines reduced to 22, they are all contaminated. They cannot be used for this research anymore. So President Bush is not offering any hope when it comes to this area of research. I do not want to get into the moral argument here because it is almost religious. It is moral and theological here. But if the President could rationalize 78 stem cell lines as being appropriate and all right for research, then he has fundamentally decided the research is permissible, I suppose. I do not follow his logic. And I do not follow the logic of some who oppose it who say that because this is a product of in vitro fertilization and has the potential for life that we should not do research. We know that in that process, some of these fertilized eggs will end up being implanted in the womb of an expectant mother in the hope she becomes pregnant, and others will not be used. It is the nature of the process. They make more of these fertilized eggs than they will need in the hopes that one will work.

Then what happens to the rest? Well, they are going to be discarded. They are not used to find cures for diseases. But for those who find it immoral to use the product of that process for medical research, I still am troubled by the notion that they have not come to the floor asking that we ban in vitro fertilization, because we know that is a natural consequence of this process. And if it is permissible and moral and legal to have a process which results in these extra cells, I do not understand the moral question about using these fertilized cells to give people a chance to live and to live their lives better. I just do not understand that.

To measure the impact of President Bush's policy, Stanford University looked at peer-reviewed research published in scientific journals. They found that embryonic stem cell research in the United States made up one-third of the papers published in 2002 but only a fourth of those published in 2004. Research is slowing down. President Bush's decision is reducing the number of opportunities for embryonic stem cell research.

The world's best and most respected scientists—our own NIH leadership—tell us that this area of scientific research could lead to treatments and cures. Dr. James Battey chairs the NIH working group on stem cells. This is what he said before the Senate Labor, HHS Subcommittee:

There's no scientist that I know who would argue that more stem cell lines wouldn't accelerate the pace of scientific research. . . .

Cell lines offer scientific opportunities that are right now beyond the reach of federal funds.

Other things have changed since President Bush's decision in 2001 as well. We have learned more about the potential of stem cell research. Dr. John Kessler is the chair of the neurology department at Northwestern University Medical School in Chicago, which I am honored to represent. He is also the father of a 20-year-old daughter who is paralyzed as a result of a spinal cord injury. He told me personally that he finds the current administration policy "unconscionable" in light of everything we have learned since 2001.

H.R. 810—the real bill, the one that is important, and the one that will make the difference-would loosen the handcuffs on America's scientists. It would allow scientists to receive Federal funding to use embryonic stem cell lines in their research if—and only if two very specific conditions are met. First, the stem cell lines must be derived from eggs that were produced for in vitro fertilization but are going to be discarded. The choice is research or destruction of these potential means of creating medical opportunities. Second, both adults to whom the eggs belong must provide written consent that the eggs be donated to science.

It is estimated 400,000 excess eggs are being stored now in clinics around the country, stored in petri dishes at 300 degrees below zero. Opponents of this research say it is unethical to use them for research. But if they are not used, they will be destroyed. How in the world can that be the right ethical, moral choice to destroy the opportunity for research to cure disease?

I see my colleague from Washington is here, and I know she wants to speak. I will close by saying this: I have met some of the children who are victims of juvenile diabetes. I guess it comes home personally when you sit down with these kids and their mothers, and the mothers say: I wake my daughter up twice in the midst of the night to take a blood test to see how she is doing. Think about that for that poor little girl being awakened twice each night. And think about the mother and her worries that that little girl, who she loves so much, may go blind or lose a limb or die. And think about the hope they have in their hearts that this research will go forward.

I have met the victims of ALS and diabetes and Parkinson's and Alzheimer's. I know they are praying we do the right thing tomorrow. I hope we pass this bill. I am not certain it will pass, but I am hopeful it will. It will have strong support on this side of the aisle, and I hope there will be enough votes on both sides of the aisle to enact it. Then the bill will go to President Bush, and he will have a moment in the history of this country to make a momentous decision. If he decides to go forward and veto the stem cell research bill, it will be the first veto of the Bush Presidency.

President Bush described himself politically when he ran for office as a compassionate conservative. His decision on the future of this bill will be the test of his compassion. If he has compassion for those who are suffering across America, who are praying for the hope this research can bring, I hope he will pray over his decision long and hard. And if we pass this bill, I hope he will sign it and give these Americans a chance for a better tomorrow.

Mr. President, I yield the floor.

The PRESIDING OFFICER. The Senator from Washington.

Ms. CANTWELL. Mr. President, I join my colleagues on the floor to speak about H.R. 810. I applaud the Senator from Illinois for his comments because I know he has many fine research institutions in his State and has met with many people who suffer from a variety of diseases who could be helped if H.R. 810 is passed and signed by the President. So I commend him for his remarks.

I certainly thank the Senator from Iowa for being out here all afternoon talking about the importance of this legislation and trying to communicate how important it is that H.R. 810, the legislation that focuses on embryonic stem cell research, be passed and signed by the President.

I also want to say I know the Senator from Kansas has been out here, and I have enjoyed working with him on a variety of pieces of legislation, particularly legislation that dealt with international marriage brokers, trying to protect women who come to America, making sure they got full information about people who were helping them apply for visas before they come to the country. So I certainly have enjoyed working with the Senator from Kansas on other legislation.

But I wish to say I think it is important we focus our debate on H.R. 810—an important bill on embryonic stem cell research—in the context of science, because I believe Congress must not stand in the way of science. I think tomorrow's vote is exactly what that is about. So I want to be clear that I support that legislation and will work to overturn any attempts to veto this legislation.

Like my colleagues, I have met these Americans who for too long have wanted to have hope. They have waited to have real hope that there would be a lifesaving stem cell research program. Many Americans believe we can do better. We know there are 3 million Americans who need help, and we understand that by investing today we can save lives tomorrow. We understand, for Americans who suffer from Alzheimer's or ALS or Parkinson's disease, it really does mean hope and a new way of looking at opportunity for them.

We will have a debate about this continuing today and tomorrow. But we need to keep in mind it is good science that is at question. For us in Washington State, with 35,000 Washing-

tonians living with Parkinson's disease today, understanding what embryonic stem cell research can do for them is of utmost importance.

We also have 300,000 Washingtonians who have been diagnosed with diabetes who, obviously, are very interested in this legislation. We have 160,000 Washington State residents who struggle with heart failure and understand there is so much that could be done in this particular area of research. We have 5,000 Washingtonians who suffer from spinal cord injuries. So there are people all over our State with various medical challenges who are looking to us to make the right decision and to allow critical research to give them promise for opportunity in the future.

At the Fred Hutchinson Cancer Research Center—I know my colleague from Iowa has visited the Fred Hutchinson Research Center—they are applying groundbreaking science and using adult stem cells to treat blood cancers such as leukemia, lymphoma, and various other diseases. They are also looking to do the same for kidney cancers.

The Benaroya Research Institute at Virginia Mason in Seattle is working with stem cells on a collaborative 5-year project to grow a living heart. The effort could lead to tissue-engineered replacement hearts, and it means that could help us with various challenges in that particular area of health care.

The University of Washington, which is in Seattle, boasts 70 scientists involved in aspects of stem cell biology addressing everything from liver disease to coronary heart disease. Three years ago, the NIH named the University of Washington one of the three exemplary centers for human embryonic stem cell research. But in the last 5 years, since President Bush banned the funding for embryonic stem cell research, it is as though our Nation has turned its back on that science and that work that could be done, and I am sure not just in Washington State. But that is a representative example of what could be done if we moved forward.

It is important we continue to move forward by passing H.R. 810. The truth is that right now adult stem cells do not have anywhere near the scientific potential as embryonic stem cells. Their application is limited. Their reach is finite. And we do have a better option. Allowing federally funded research on embryos that would otherwise be destroyed would provide a much-needed expansion. Everything from eradicating, in our past, polio to mapping the human genome, our Nation has been a leader and an innovator in science and medicine. So let's not fall behind now. Just as we are challenged with so many of these diseases, we need to do more.

Of the original 78 stem cell lines the administration permitted scientists to work on, only 21 are available today. Lab scientists must turn to private investors and already struggling State governments to carry on this critical

research. So researchers in my State, in the State of Washington, say that Federal funding would increase research opportunities and allow scientists to use that money much more effectively.

In March of 2006, the University of Washington announced that because of Federal funding restrictions, it would seek to establish a stem cell institute with private money and, instead, looks to raise \$100 million in private funds to help it move forward. The University of Washington plans to reflect the intense competition it faces from other universities around the country that are boosting their research into stem cells which have permitted them to treat a variety of diseases. So the competition will continue. But we could be working together in a much more collaborative fashion, in a way that would help us extend the scope of that research.

It is very important because so many of those involved in this particular area believe passionately we need this new area of expansion. One of those individuals, Dr. Storb of the Fred Hutchinson Cancer Research Center in Seattle, recently said this:

We have exhausted research on adult stem cells. They do not do the trick. We have worked with them for 30 years now and know that they do not make all of the tissues in the body.

He further went on to say:

If the public wants cell-based therapies, then we must conduct that kind of stem cell research. We may learn more from embryonic cells how to program adult cells, but we have to work with embryonic cells to do just that.

So this Congress, I believe, must not stand in the way of science. We have three bills we will vote on tomorrow, but only H.R. 810 actually clears the way for critical research that could lead to cures for so many debilitating diseases.

There is no viable alternative to improving the research and serious investments that I believe H.R. 810 will provide. When we are talking to Americans who suffer from diseases such as Alzheimer's, Parkinson's, and others, I think it is important, as my colleague from Illinois stated, that we must keep in mind the stories of individuals.

Mr. President, one such individual is a 4-year-old who died of brain cancer. Her mother wrote to us saying how important this bill was in holding opportunities for other people in other families who suffer from brain cancer. To me, it is so important that we pass this legislation and help those individuals and families who are suffering by giving them hope for promising research that we know science can provide.

I yield the floor.

The PRESIDING OFFICER. The Senator from Iowa is recognized.

Mr. GRASSLEY. Mr. President, today, as everybody is doing, I want to discuss the three stem-cell-research-related bills before the Senate. I have been in the Senate for 26 years now. Every day, we make decisions that impact Americans. It becomes difficult,

however, when we debate bills that involve the lives of women and families, especially those who are sick and dying. We must be cognizant of their plights, but we cannot forget about those who don't have a voice.

Tomorrow, I will vote in favor of those who are not yet brought into this world. I will vote for those who don't have a chance to speak against legislation that doesn't give them a chance at life.

First, I intend to support S. 3504, the ban on fetus farming. This bill states that a person cannot solicit or knowingly acquire, receive, or accept a donation of fetal tissue or an embryo if the pregnancy was initiated to provide such material. This bill will reduce the likelihood that women will be used solely for their production of embryos. We have to draw the line, and we have to prevent the corruption that could occur.

Second, I intend to support a bill numbered S. 2754, which directs the National Institutes of Health to fund alternative techniques for stem cell research. It will allow researchers to use different techniques to derive pluripotent stem cells without destroying human life. This research could be done under current law, but a vote in support of this bill will send a signal to the NIH that we want to see even more of this research.

Finally, I will oppose H.R. 810 because it would expand Federal funding for embryonic stem cell research.

Some of my colleagues will characterize the bill, H.R. 810, as a lifesaving opportunity for many people with diseases. The focus will be on promises, hopes, and dreams. This focus disregards that this bill will allow researchers to use and abuse embryos. And there are enormous moral and ethical consequences associated with that research

You cannot mess with the facts. An embryo is life. No Senator can disagree with that assertion. Once you realize that fact—that an embryo is life—you have to realize that this bill takes life and plays with it.

In addition, this bill doesn't prohibit cloning. In fact, it will make cloning even more attractive. Why would we want to go down this road of unethical research when we have a method that already works?

We all know that adult stem cell research has proven effective. We are investing the taxpayers' money in research that benefits the American people. We in Congress have to realize that there is a difference between hope and hype. I, for one, will not be misled.

Adult stem cells have already proven effective for over 72 treatments. I will not list them all, but some of them relate to adult stem cells being used to treat brain tumors, multiple sclerosis, arthritis, and Parkinson's disease. Peripheral blood stem cells have treated testicular cancer, lymphoma, and breast cancer. Cord blood stem cells have treated leukemia. Olfactory stem

cells from the nose can develop into heart cells, liver cells, kidney cells, muscle cells, brain cells, and nerve cells. Bone marrow stem cells and stem cells from fat have the ability to differentiate and form other body tissues.

I wish I could list the advances with embryonic stem cell research, but I cannot; there are none. There are no treatments for human patients. So there is no evidence on which to argue that this research should be expanded with public resources.

I have a story about a person that I have known for 44 years, David Foege. I have known him since he was a page at the Iowa State Legislature back in 1962. He is originally from Waverly, IA, so even though he lives in Florida, I still consider him a constituent. There is evidence, then, through Dave Foege that we should continue supporting adult stem cell research.

Just 2 weeks ago, I had an opportunity to meet with David, who is now 61 years old and living in Florida. This is the story he told to me. David was given a life sentence because of heart failure. Three years ago, David was told that he had little chance of surviving. His heart was losing all function and there was little that doctors could do. David then turned to stem cell therapy. He found doctors in Bangkok that would harvest his own stem cells and then inject them back into his own heart. His own stem cells-his adult stem cells, not embryonic stem cells-cured him. His heart function has improved by 70 percent. David is alive and well, playing golf, and currently taking a cruise in Belize. Without adult stem cell therapy, David would not be here.

Embryonic stem cell research, on the contrary, has not yielded this kind of success that we have from adult stem cells. It makes sense to direct public resources to what works. Prioritizing resources: It makes sense for public resources to help those with heart disease, the No. 1 killer in the United States. It makes sense to encourage research that will work for those with Parkinson's, diabetes, cancer, and autoimmune diseases. Why would we want to desert patients in the United States by spending dollars on research that has not been proven?

I will oppose H.R. 810 not only because of the ethical consequences but because it doesn't prioritize our use of fiscal resources.

Let's be clear. There is no current policy in place that bans embryonic stem cell research. Everybody knows that we are doing some through the Federal Government because, being perfectly legal in the United States, President Bush, in 2001, allowed taxpayer dollars to be used for that research. This debate in the Senate today and tomorrow is not whether we want to ban or allow research, it is whether we want to spend our dollars on embryo creation and destruction.

Today, the Congress appropriates nearly \$30 billion for medical research

through the National Institutes Health. Every year, hundreds of advocates come to my office to say that \$30 billion is not enough. They say these funds are important to continue research and trials that are already started. So what would happen to those arguments if there was a higher priority placed through passage of H.R. 810? Will we have to double the budget again for NIH like we did between 1998 and 2003? I don't think that is possible given that was already done starting in the year 1998. So it makes me wonder whether we are prioritizing the use of Federal research dollars through the National Institutes of Health the way we should.

We don't have an infinite amount of Federal funding. We cannot pretend there is enough money to go around. We do have to prioritize. So I urge my colleagues to realize that Congress can only disburse so many funds. We can only fix so many problems. Therefore, we need to think rationally. We need to make tough choices. One of those tough choices might be to pursue what is proven to work, which is greater use of adult stem cells. The right choice, then, is to invest in what works. Let's keep the ball rolling with research that has been proven.

Mr. President, I yield the floor.

The PRESIDING OFFICER. The Senator from Texas is recognized.

Mrs. HUTCHISON. Mr. President, I ask unanimous consent to have 5 minutes to talk as in morning business regarding the resolution that will be on the Senate floor later tonight or tomorrow regarding condemning Hezbollah.

The PRESIDING OFFICER. Is there objection? Without objection, it is so ordered. The Senator from Texas is recognized for 5 minutes.

(The remarks of Mrs. HUTCHISON are printed in today's RECORD under "Morning Business.")

Mrs. HUTCHISON. I yield the floor.
The PRESIDING OFFICER. The Sen-

The PRESIDING OFFICER. The Senator from Ohio.

Mr. VOINOVICH. Mr. President, I rise today in support of legislation to expand the Federal investment in adult and umbilical cord blood stem cell research, as well as scientific ways to create embryonic stem cell lines without destroying human embryos.

It is important to point out that there are two very important categories of stem cells. I know that my colleagues are going to have a little difficulty with this because I have had difficulty with this. This is medical terminology.

The first, embryonic stem cells, as their name suggests, are derived from human embryos developed from eggs that have been fertilized in an in vitro fertilization clinic. Removing stem cells from these embryos destroys their potential life, making their use very controversial and something I cannot morally support.

On the other hand, adult stem cells are undifferentiated cells found among

differentiated cells in tissues or organs. Adult stem cells can renew themselves and will eventually differentiate into a special cell. However, before this occurs, the undifferentiated stem cells can be gathered by scientists without any harm to the individual.

Also included in this ethical category of stem cells are those from umbilical cord blood derived from the placenta of a newborn baby. With the birth of my seventh grandchild last summer, I learned a great deal about the benefits of preserving cord blood stem cells. Once considered medical waste and discarded after birth, science has determined that cord blood has the potential to save thousands of lives.

And that is exactly why I came to the floor today, to explain these differences and to highlight the unmatched value of adult and cord blood stem cells.

By the way, when I found out about the umbilical cord blood coming from the placenta, we are now freezing that umbilical cord, and each year we will pay some money to maintain it. But that umbilical cord can be used to help my seventh grandchild or, for that matter, the whole family. It is something more people should find out about.

I am concerned that the vast majority of Americans are unaware that some of the most promising advances in medical research and treatment today are not attributed to embryonic stem cells; rather, they are the result of noncontroversial, nonlife-ending use of adult and umbilical blood cord cells.

Unfortunately, many of the individuals who support embryonic stem cell research have been kept in the dark about the advances of umbilical and adult stem cell treatments and have been oversold on embryonic stem cell research, which is still in its infancy.

While embryonic cells have never been successfully used to treat even one disease—not used to treat one disease to date-adult stem cells have been used to treat 72 diseases, such as breast cancer, multiple sclerosis, rheumatoid arthritis, sickle cell anemia, spinal cord injuries, and many others. I have read reports that adult stem cells from a young girl's own fat cells were used to repair or regenerate a 19square-inch section of her skull. I have also learned of a Parkinson's patient who has been without the vast majority of the disease's symptoms for 6 years after being treated with his own adult stem cells.

Even more encouraging, the potential use of adult and umbilical cord therapies continues to expand. In fact, there is a real possibility that these types of stem cells will be able to yield the same results as embryonic, or what they call pluripotent stem cells, without the need to destroy human life.

The American Journal of Pathology recently reported that a group of scientists have isolated a novel population of multipotent adult stem cells from human hair follicles—think of that, human hair follicles—which, like embryonic stem cells, express neural crest and neuron stem cell markers, as well as the embryonic stem cell transcription factors.

In other words, what we are saying is that they produce the same thing we would get if we were using the embryos that so many are anxious to use.

I was introduced to the promise of adult and umbilical stem cell research by experts at the National Center of Regenerative Medicine in my hometown of Cleveland, OH. The individual institutions involved in this partner-ship—Case Western Reserve University, University Hospital, and the Cleveland Clinic—each bring an expertise to the center that is leading the Nation in the use of nonembryonic stem cells to regenerate new tissue and diseased organs rather than using drugs or devices to improve the function of the organ.

The National Center for Regenerative Medicine team has told me that they are interested in the rapid translation of adult and umbilical cord stem cell technology into patients that is not possible today with embryonic stem cells.

Since 1976, investigators at the center have studied nonembryonic stem cells and performed their first stem cell transplant as early as 1980. That is back in 1980. Investigators at the center are now able to cure leukemias and lymphomas with nonembryonic stem cell transplantation, as well as to fix unstable bone fractures and treat genetic disorders.

In the next several years, investigators at the center believe they will be able to address cancer, bone, heart, and neurological disorders with nonembryonic stem cell treatments. They are hopeful that the new advances will lead to treatment of degenerative arthritis, will decrease the severity of graft versus host disease after stem cell transplantation, and allow physicians to use a patient's own stem cells to repair heart damage following congestive heart failure, as well as use their own neural stem cells to improve function after spinal cord damage. All of the things that folks are talking about because we have to have these embryonic stem cells because this is what we have to do—we are already on our way. We are making progress with adult and with umbilical cord stem cells.

The center has 10 ongoing or planned clinical trials to further explore the use of stem cell therapies to reduce the risks of chemotherapy, treat certain heart conditions, and improve umbilical stem cell treatment for leukemia. I recently had the privilege to personally hear two young Ohioans discuss the successful adult stem cell treatment received at the center for an aggressive form of leukemia and a severely broken bone that would not heal with traditional treatment.

I will never forget this young woman who was there. It was a meeting at the regenerative center. She talked about the fact that she was in this terrible motorcycle accident. She was a mountain climber, she was a skier, she was a runner. She was told by all of her doctors that she wouldn't be able to run again, that she would have to hobble around. She went to the Cleveland Clinic, to the regenerative center, and as a result of using her stem cells, they were able to repair the problem that she had in her leg.

Today she is running. I am getting goosebumps right now. I will never forget it. She started to cry. She hugged her doctor. We all started to cry. It was a miraculous thing using adult stem cells.

As a result, I support the legislation introduced by my colleagues from Pennsylvania, the Alternative Pluripotent Stem Cell Therapies Enhancement Act. The bill would require the Secretary of Health and Human Services to develop techniques for the isolation, derivation, protection or testing of stem cells not derived from a human embryo.

The bill would also require the Secretary to prioritize stem cell research that will reap near-term clinical benefits. It is my hope that this type of progress will help eliminate the controversy surrounding embryonic stem cell research without any compromise of scientific advancement.

I have the greatest sympathy for patients and their families who continue to struggle with a wide range of painful, life-ending diseases. Further, I understand what it is like to watch a loved one suffer and the tragedy of losing a member of your family, even a young child, to a life-ending disease. I personally lost my father to diabetes and my nephew C.T. to bone cancer. I have been a witness to the devastating effects of Alzheimer's, arthritis, and many other diseases.

One can hardly take issue with these individual efforts to seek out a potential cure, but too often, I fear, proponents of embryonic stem cell research provide patients with false promises from unproven, unexplored embryonic stem cells, while ignoring the real substantial progress that has been made with adult and blood cord treatments.

I am gravely concerned about the possible implication of spending tax-payers' dollars on an issue such as embryonic stem cell research that divides Americans on moral and ethical grounds, and I believe it is my moral responsibility to direct the Federal Government's dollars toward the areas of research that have the greatest near-term potential to help the largest number of Americans.

Since I have been a Member of the Senate, we have doubled the funding for the National Institutes of Health, NIH, and greatly increased the amount of medical research the Federal Government is able to fund, including increasing the amount of money available for research on all stem cells from \$226 million in 1999 to \$568 million this year.

However, as you know, Mr. President, in recent years with the cost of the war, the need to protect our homeland, and natural disasters such as Katrina, the amount the Federal budget has available for these priorities is getting smaller and smaller. We are seeing that now with the appropriations bills in the Senate.

I meet with groups all the time, and they ask me for increases in funding for research for diseases that personally impact on their families. I am sure they visit your office, Mr. President, every couple of weeks: We want more money for NIH to take care of this, to take care of that. Just within my own family, I met recently with my former brother-in-law in support of childhood cancer, and through my son I have heard a very emotional presentation by a group of my constituents on behalf of juvenile diabetes research. Again, if evervone in the Senate had been at that meeting, I think they would have said: Look, we have to do more, spend more money on juvenile diabetes.

There is a tremendous need to pursue treatments for these and many other diseases, but we face a reality of limited funding. That is the real world.

We have to be smart about spending our money, and in the current budget environment, I have concerns that increasing funding for research on embryonic stem cell will take away opportunities for research in areas such as adult and umbilical cord blood research, or even research for treatment of specific diseases such as cancer, juvenile diabetes, and others that have proven their usefulness.

Consequently, and in light of all the advances and results science has provided with adult and umbilical blood cord stem cells, I urge my colleagues to continue to direct Federal funding toward the noncontroversial areas of adult and umbilical cord blood stem cell research. I urge my colleagues to do that.

Mr. President, I yield the floor.

The PRESIDING OFFICER. The Senator from Kansas.

Mr. BROWNBACK. Mr. President, as we are waiting for my colleagues to come to the floor, I want to address some issues that have been brought forward and talked about previously.

Mr. President, I see my colleague from Iowa, and I am prepared to answer—he had raised a question about whether we had 72 different areas of treatment for adult stem cells, and so I wanted to respond.

The PRESIDING OFFICER. Unfortunately, the majority's time has expired.

Mr. BROWNBACK. Mr. President, I vield the floor.

Mr. HARKIN. Mr. President, I see the distinguished Senator from Washington is here to make her statement on this bill, and I would yield the floor to Senator MURRAY for her comments.

The PRESIDING OFFICER. The Sen-

ator from Washington is recognized.

Mrs. MIRRAY Mr. President. I

Mrs. MURRAY. Mr. President, I thank my colleague for yielding me

time tonight on this important legislation. I rise tonight to express my support for expanding stem cell research. This innovative research offers us a chance to save lives.

Families across this country are holding out hope that we will finally allow science to move forward and deliver on the promise of stem cell research. That is exactly what we should be doing. But, unfortunately, today the hands of American scientists are tied by political restrictions. I believe we can expand stem cell research while still maintaining strict ethical safeguards. That is why I will be supporting H.R. 810.

Back in 2001, President Bush imposed restrictions on promising stem cell research. Since that time, we have learned that there aren't as many useful stem cell lines as the President sugested. The Bush administration promised us that 60 lines would be available for research. To date, only 15 are available, and it appears that all of those lines have contamination problems. The President's restrictions have held back American science and stalled promising research. It is time to correct that mistake and allow our country to make progress.

Stem cell research is about improving medicine, and it is about saving lives. For patients with Parkinson's or Alzheimer's, diabetes or multiple sclerosis, stem cell research holds promising potential to provide the tools to understand, treat, and someday cure these devastating diseases.

I understand the challenges and frustrations these diseases cause. When I was just 15 years old, my dad was diagnosed with multiple sclerosis. In a few short years, his illness became very bad, so bad that he couldn't work anymore, and for most of my life my dad was in a wheelchair. His illness had a profound impact on my entire family. My mom, who stayed home to raise seven kids, had to work to care for him and had to get a job so she could support our family. She got that job, but it was never enough to support seven kids and a husband who was in a wheelchair and with growing medical bills.

I can only imagine how different our lives would have been had there been a cure for M.S. Back then, we didn't have the tools to find a cure, but today we do, and these tools unfortunately are being blocked by an ideological policy that puts politics over science. I think we can do better than that.

My dad's challenges are similar to the struggles millions of Americans and their families face every day. They deserve a chance, and they deserve hope. That is why we can't let the current restrictions stand.

A short time ago, I received a letter from a constituent of mine who lives in Mercer Island, and he wrote:

My 17-year-old son was recently involved in an automobile accident and is now paralyzed from the upper chest down. Stem cell research looks to be our brightest hope by far. Please help give him the chance to ride a bike, go for a hike, and run with his friends again. Please, support stem cell research.

As that father points out, this is about people. It is about keeping our country on the cutting edge of science and research, and I am proud to represent a State that has a strong reputation for scientific research. But for our country to remain a leader in this promising field, our scientists and our researchers need the support of our Government. America should never take a back seat to other countries in the search for promising new cures.

Unfortunately, the President's current stem cell research policy is tying the hands of our scientists by limiting the number of lines eligible for Federal funding. We can do better than that.

In fact, the majority of this Congress has been trying to correct the President's mistake for over a year now. H.R. 810 passed the House of Representatives 13 months ago. Since that date, my colleagues and I have been fighting to bring this issue of stem cell research to the Senate floor. We wrote letters, we pleaded on the floor, and we asked Republican leaders numerous times for even a few hours to debate and pass this bipartisan bill. Our efforts to promote research and offer hope had been denied at every turn. But now, finally, our day has come, and after more than a year of obstruction, we finally have a chance to offer hope to millions of patients and their families. On a bipartisan basis, I believe this bill will pass.

But, of course, we know that is not the whole story. Shortly after we got word that this bill would finally come to the floor, I was dismayed to see headlines announcing that Karl Rove. President Bush's chief political officer and adviser, guaranteed a veto of this important bill. In nearly 6 years in office, President Bush has never once vetoed a bill. It is pretty amazing to me that he would choose this bill—this bill which offers basic hope and opportunity to so many Americans—for his first veto. I believe the President is wrong on this issue, and I think threatening a veto is wrong.

I am here this evening to pledge my support for this bill and to call on my colleagues to support it. But next, I call on them to ask the President in no uncertain terms to stand with us in support of open opportunity, stand with us in support of medical research, stand with us and, more importantly, with millions of Americans who are waiting on a cure, in support of stem cell research.

For far too long, this administration's ideology has trumped research. Politics has been more important than science. With this bill, President Bush has a chance to change course and put people ahead of personal political ideology. I urge him to do the right thing.

For our patients, for their families, and for the future of our Nation's research leadership, it is time for the Senate to pass H.R. 810, and it is time for the President to sign it. Let's take the handcuffs off of our scientists and

let them find the cures that will save lives.

Mr. President, I yield the floor.

Mr. HARKIN. Mr. President, I thank the Senator from Washington for her very eloquent statement, and I thank all of the Senators who have come over here today to speak on this important issue

We have about 20 minutes left in this half hour. I don't have any other Senators right now, but if there are other Senators on our side who wish to take a few minutes to speak on this bill, I would be glad to yield to them.

However, I would like to take this time to sum up, if I can, what we have heard today. We have come to the end of our first day of debate on stem cell research, and I think it has been a very enlightening debate and a very good exposition of the different sides of this issue. I hope the American people who have tuned in to watch this have learned a great deal about why we need to pass H.R. 810, the Stem Cell Research Enhancement Act. As we know, that bill passed the House by a bipartisan majority over a year ago, and I think it has a strong bipartisan majority here in the Senate. Certainly the bill itself is sponsored bipartisanly. If we can pass it tomorrow—and I am confident we can and we will-H.R. 810 can go straight to the President's desk.

I would like to reiterate a few things we have heard today.

First, H.R. 810 has enormous popular support. I have here a letter that was just transmitted to me, and it is a list of different advocacy groups, health organizations, research universities, scientific societies, religious groups, and other interested institutions and associations representing millions of patients, scientists, health care providers, and advocates, writing in strong support for H.R. 810. They point out in this letter that this is the bill which holds promise for expanding medical breakthroughs. The other two bills, the Alternative Pluripotent Stem Cell Therapies Enhancement Act, S. 2754, and the Fetus Farming Prohibition Act, S. 3504, are not substitutes for a "yes" vote on H.R. 810.

This letter is signed by 590 advocacy groups. I have been on this Senate floor now 21 years. We all get letters and things that come in expressing support, but I daresay I have never seen anything as overwhelming as this: 590 different groups. Earlier this year, I submitted a list of 205 different groups.

Mr. President, I ask unanimous consent that at the conclusion of my comments on this portion, this list of 590 groups be printed in the RECORD.

The PRESIDING OFFICER. Without objection, it is so ordered.

(See exhibit 1.)

Mr. HARKIN. I thank the Presiding Officer.

Again, those are advocacy groups and scientific associations—590.

How about the American people? Three out of four Americans agree: support stem cell research. The question asked in a national poll: Do you support embryonic stem cell research? Seventy-two percent of Americans said yes. Seventy-two percent. That is pretty overwhelming.

I heard the distinguished Senator from Ohio here just a few moments ago say that one of the reasons he was opposed to the bill was because we wanted to do things that would not divide Americans. He thought this would divide Americans. Divide Americans? Seventy-two percent are in favor of it. Over 590 different advocacy groups expressing support, and 205 other diseaserelated groups all in support. This doesn't divide America at all. Of course, there is always going to be somebody opposed to something around here. But I haven't seen anything that received this much overwhelming support in a long time. As a matter of fact, passing embryonic stem cell research, H.R. 810, will pull Americans together in the fight against disease. And it is bipartisan. As I said, the bill passed the House bipartisanly. The sponsors of the bill itself were three Republicans and three Democrats.

It was stated earlier today a couple of times about a letter that former First Lady Nancy Reagan had written. I thought I would have it blown up and put on a chart for people around the country to take a look at, just to show you how this has nothing to do with partisanship. It shows it is from the office of Nancy Reagan dated May 1, 2006, a letter to Orrin Hatch, Senator Orrin Hatch of Utah, who was one of the cosponsors of this bill. It says:

Dear Orrin:

Thank you for your continued commitment to helping the millions of Americans who suffer from devastating and disabling diseases. Your support has given so much hope to so many.

It has been nearly a year since the United States House of Representatives first approved the stem cell legislation that would open the research so we could fully unleash its promise. For those who are waiting every day for scientific progress to help their loved ones, the wait for U.S. Senate action has been very difficult and hard to comprehend.

I understand that the U.S. Senate is now considering voting on H.R. 810, the Stem Cell Research Enhancement Act, sometime this month. Orrin, I know I can count on friends like you to help make sure this happens. There is just no more time to wait.

Sincerely, Nancy.

When you have seen a loved one suffer from Alzheimer's—I am sure as Mrs. Reagan watched the former President suffer from Alzheimer's—it motivates you to say: Whatever we can do to advance the research, to hopefully get a cure someday, that is what we should do.

For those of us who have friends who have Parkinson's disease, those of us who have seen friends and loved ones die of Lou Gehrig's disease, for those of us who have members of our family or close friends who have had spinal cord injuries, this motivates us to do everything humanly possible to expand this field of research.

My friend Christopher Reeve said, one time when we had watched a film of a rat, a white mouse or white rat, that had its spinal cord damaged so it couldn't walk and then it received embryonic stem cells and then it walked again, Christopher Reeve, former Superman said, "Oh, to be a rat."

It holds so much promise, embryonic stem cell research, to ease the suffering and the pain of so many people.

I hear today talk about we have to do adult stem cells; maybe there is not enough money.

Again, I refer to my friend from Ohio, who was here earlier who said funding for medical research is probably going down because of the war and because of Katrina and because of homeland security.

I said: Wait a minute, earlier this year this Senate voted 73 to 27, to put \$7 billion back in the budget so we wouldn't cut medical research—73 votes in the Senate. I don't know, 73 votes is pretty overwhelming. It was \$7 billion we were supposed to put back in to help medical research. I don't know to what the Senator was referring.

I have heard talk today about adult stem cells and all these other things and how we had adult stem cells do this and adult stem cells do that. Why haven't embryonic stem cells led to treatment as much as adult stem cells have? Scientists have been doing research on adult stem cells for over 30 years, and we still, after 30 years, have not extracted one stem cell line from adult cells—not one.

Now embryonic stem cells were only derived in 1998, 8 years ago, and they have only been getting Federal funding in a limited manner since 2002, under the guidelines the President set down in 2001, which limited the number of stem cell lines to then 78, which we found out later was only 21 stem cell lines.

Again, there are no arbitrary restrictions on research on adult stem cells. Scientists and private companies don't have to be skittish about doing the research. They don't have to worry that all of a sudden the Federal Government is going to ban it or limit it, so they can plan ahead and do long-term research.

Let's compare that situation with human embryonic stem cells. As I said, we didn't derive them until 1998 and the first Federal grant wasn't awarded until 2002. Even now, only a tiny fraction of the total Federal budget for human stem cell research is used for human embryonic stem cells. The vast majority still goes for adult stem cells.

Here it is. I pointed this out earlier today. Human embryonic stem cells in fiscal 2006 from NIH, \$38.3 million. Adult stem cells, \$200 million. Again, only a tiny fraction going for human embryonic stem cells. Five times as much is going for adult stem cell research. So it is no wonder, after 30 years and all this research and all this money, that more diseases are being treated today with adult stem cells.

Scientists have only been studying embryonic stem cells for 5 years, with

one arm tied behind their back. That one arm being tied their back by the President's proclamation of August 9, 2001, that only stem cell lines derived before 9 p.m. that evening could receive Federal funding. Anything derived after 9 p.m. could not receive Federal funding.

I have wondered ever since, why was it morally acceptable to use stem cell lines derived prior to 9 p.m. on August 9 of 2001 but morally unacceptable for funding of stem cell lines derived after 9 p.m. Can someone please tell me the ethics of that. Can someone please tell me why 9 p.m. on August 9 of 2001 is some kind of a moral dividing line? It is totally arbitrary. The President could have said stem cell lines derived at 10 p.m. or he could have said stem cell lines derived before Christmas of this year. It is the same thing. No one has taken this floor to define why August 9, at 9 p.m, is some kind of a moral dividing line.

The fact is, it doesn't really matter what I think about the potential of embryonic stem cell research. It doesn't matter a heck of a lot what other Senators may think about the potential of embryonic stem cell research. What matters is what does the great body of scientists think about the potential.

The overwhelming majority of reputable biomedical scientists also believes we should pursue embryonic stem cell research; not to the exclusion of others but that we should pursue it.

I have a letter from Dr. J. Michael Bishop who won the Nobel Prize in medicine in 1989. Here is what he says:

The vast majority of the biomedical community believes that human embryonic stem cells are likely to be the source of key discoveries relating to many debilitating diseases. In fact, some of the strongest advocates for human embryonic stem cell research are those scientists that have devoted their careers to the study of adult stem cells.

I have a letter from Dr. Alfred G. Gilman, who won the Nobel Prize in medicine in 1994.

It has become obvious, however, that the number of stem cell lines actually available under current policy is too small and is controlled by a limited monopoly, which has made it significantly more difficult and expensive for research to be conducted. These limits have hindered the important search for new understanding and treatment of devastating diseases.

I have a letter from the Director of the NIH, Dr. Elias Zerhouni.

Embryonic stem cell research holds great promise for treating, curing, and improving our understanding of disease.

The breakthroughs are coming. But they take time. They take a lot of scientists researching. This is not something you can put two people on. They need a lot of different lines. Embryonic stem cell research should be ongoing at universities all across America, at our great research institutions, and it ought to be done under the guidance and direction and ethical guidelines of NIH and the ethical guidelines that we have in this bill

The clampdown on embryonic stem cell research before it even has a

chance to start shows a total lack of understanding about how science works, how research works. I have often said that basic research is similar to having 10 doors and they are closed. There is a high probability that behind one of the doors is the answer to your question. If you open one door, you know what the odds are of finding the right answer. If you open two doors, the odds are a little bit better. If you open five doors, the odds are 50-50.

That is what basic research is about. It has been said here a lot of the earlier research on fetal tissue came to nothing. A lot of basic research comes to nothing—in terms of an actual application. But almost all basic research adds to our body of knowledge. Maybe, from one of those basic research grants that was put on the shelf, some other scientist coming along later on might pick something from that, put two or three together and find something.

I am reminded of John Embers, a scientist—I believe he was at Harvard. I will check my facts on that, but I believe he was a doctor at Harvard many years ago. I am talking about a long time ago. I am talking about in the 1940s. He had done some interesting research, basic research on kidney cells of monkeys because they had unique properties. It was a funny research. It was on certain Rhesus monkeys and the oddity of certain kidney cells.

Dr. John Enders didn't get anything for it. He did the research, put it on the shelf, and nothing ever came of it, until a few years later another scientist, examining in another area, remembered Dr. Enders' work, went back and got it, coupled it with his, and came up with something called the Salk polio vaccine. It wasn't until over 25 years later that Dr. John Enders finally received the Nobel Prize for his research.

But I suppose someone 5 years after Dr. Enders had done his research would have said: Why did we spend money on that foolish kind of research? It didn't lead to anything. It kept some scientists employed, but it didn't lead to anything. But Dr. Salk came along, coupled that research with what he was doing and came up with the Salk polio vaccine.

That is a true story.

Again, we have to understand a lot of this is basic research. A lot of it will lead to nothing. But as more and more scientists get involved in examining embryonic stem cells and how they grow, how they multiply, how they differentiate, how they become nerve tissue, how they become brain tissue, how they become skin tissue, how they become blood tissues—as they begin to investigate that, I am sure there will be a lot of blind alleys. But I submit that everything that is done builds the body of scientific evidence that we need, the science that will eventually lead to a cure of a disease. That is the promise of embryonic stem cell research. To stop it now or to limit it doesn't make sense.

People talk about the ethics and morality. I have heard talk about we have to protect innocent life. This is an embryo; an embryo with 100 cells, 200 cells. You can take whatever view you want of that embryo. The point is that the bill we are talking about does not destroy one embryo. It only says that we can get funding for the research on those. These are embryos that are going to be discarded anyway, in in vitro fertilization clinics. They are being discarded every day.

Why don't people come out and say: Stop in vitro fertilization. Make it a crime. You don't hear anybody saying that because 50,000 babies were born last year to people who wanted to have a baby and couldn't have one and used in vitro fertilization. Once they have their children, they call up the in vitro clinic and say: I don't want the remaining embryos, just discard them. I ask you, what is the moral thing to do, just discard them or, with the written consent of the donors, use those embryonic stem cells to save lives and ease suffering and cure disease? That, to me, is the moral and the ethical choice.

I see my time is up and I yield the

#### EXHIBIT 1

U.S. SENATE, Washington, DC, July 14, 2006.

DEAR SENATOR: We, the undersigned patient advocacy groups, health organizations, research universities, scientific societies, religious groups and other interested institutions and associations, representing millions of patients, scientists, health care providers and advocates, write you with our strong and unified support for H.R. 810, the Stem Cell Research Enhancement Act. We urge your vote in favor of H.R. 810 when the Senate considers the measure next week.

Of the bills being considered simultaneously, only H.R. 810 will move stem cell research forward in our country. This is the bill which holds promise for expanding medical breakthroughs. The other two bills—the Alternative Pluripotent Stem Cell Therapies Enhancement Act (S. 2754) and the Fetus Farming Prohibition Act (S. 3504)—are NOT substitutes for a YES vote on H.R. 810.

H.R. 810 is the pro-patient and pro-research bill. A vote in support of H.R. 810 will be considered a vote in support of more than 100 million patients in the U.S. and substantial progress for research. Please work to pass H.R. 810 immediately.

Sincerely.

A O North America: AAALAC International: AARP: Abbott Laboratories: Acadia Pharmaceuticals; Accelerated Cure Project for Multiple Sclerosis; Adams County Economic Development. Inc.; AdvaMed (Advanced Medical Technology Association); Affymetrix, Inc.; Albert Einstein College of Medicine of Yeshiva University; Alliance for Aging Research; Alliance for Lupus Research; Alliance for Stem Cell Research; Alnylam US, Inc.; Alpha-1 Foundation; ALS Association; Ambulatory Pediatric Association; AMDeC-Academic Medicine Development Co.; America on the Move Foundation; American Academy of Neurology.

American Academy of Nursing; American Academy of Pediatric Dentistry; American Academy of Pediatrics; American Association for Cancer Research;

American Association for Dental Research; American Association for Geriatric Psychiatry; American Association for the Advancement of Science; American Association of Anatomists; American Association of Colleges of Nursing; American Association of Colleges of Osteopathic Medicine; American Association of Colleges of Pharmacy; American Association of Neurological Surgeons/Congress of Neurological Surgeons; American Association of Public Health Dentistry; American Autoimmune Related Diseases Association; American Brain Coalition; American Chronic Pain Association; American College of Cardiology; American College of Medical Genetics; American College of Neuropsychopharmacology; American College of Obstetricians and Gynecologists.

American College of Surgeons; American Council on Education; American Council on Science and Health; American Dental Association; American Dental Education Association: American Diabetes Association; American Federation for Aging Research; American Gastroenterological Association: American Geriatrics Society; American Institute for Medical and Biological Engineering; American Lung Association; American Medical Association; American Medical Informatics Association: American Medical Women's Association; American Pain Foundation; American Parkinson's Disease Association: American Parkinson's Disease Association (Arizona Chapter); American Pediatric Society; American Physiological Society; American Psychiatric Association.

American Psychological Association; American Public Health Association; American Society for Biochemistry and Molecular Biology; American Societv for Bone and Mineral Research: American Society for Cell Biology; American Society for Clinical Pharmacology and Therapeutics: American Society for Microbiology; American Society for Neural Transplantation and Repair; American Society for Nutrition; American Society for Pharmacology and Experimental Therapeutics; American Society for Reproductive Medi-cine; American Society for Virology; American Society of Clinical Oncology; American Society of Critical Care Anesthesiologists; American Society of Hematology; American Society Human Genetics; American Society of Nephrology: American Society of Tropical Medicine and Hygiene; American Surgical Association: American Surgical Association Foundation.

American Thoracic Society; American Thyroid Association; American Transplant Foundation; Americans for Medical Progress; amFAR, The Foundation for AIDS Research; Arizona State University College of Nursing; Arthritis Foundation; Arthritis Foundation, Rocky Mountain Chapter; Association for Clinical Research Training; Association for Medical School Pharmacology Chairs; Association for Prevention Teaching and Research; Association for the Accreditation of Human Research Protection Programs, Inc.; Association of Academic Chairs of Emergency Medicine; Association of Academic Departments of Otolaryn-Association of gology: Academic Health Centers; Association of Academic Physiatrists; Association of American Medical Colleges; Association of American Physicians; Association of American Universities; Association of American Veterinary Medical Colleges

Association of Anatomy, Cell Biology and Neurobiology Chairs; Association of Anesthesiology Program Directors; Association of Black Cardiologists; Association of Chairs of Departments of Physiology; Association of Independent Research Institutes; Association of Medical School Microbiology and Immunology Chairs; Association of Medical School Pediatric Department Chairs; Association of Medical School Pharmacology Chairs; Association of Professors of Dermatology; Association of Professors of Human and Medical Genetics; Association of Professors of Medicine; Association of Public Health Laboratories; Association of Reproductive Health Professionals; Association of Schools and Colleges of Optometry; Association of Specialty Professors; Association of University Anesthesiologists; Assurant Health; Asthma and Allergy Foundation of America: Athena Diagnostics; Aurora Economic Development Council.

Axion Research Foundation; B'nai B'rith International; Baylor College of Medicine: Baylor College of Medicine Graduate School of Biomedical Sciences: Biotechnology Industry Organization; BloodCenter of Wisconsin, Inc.; Blue Cross and Blue Shield Foundation on Health Care; Boston Biomedical Research Institute: Boston University School of Dental Medicine; Boston University School of Public Health: Brigham and Women's Hospital; Bristol-Myers Squibb Company; Broadened Horizons, LLC; Brown Medical School; Buck Institute for Age Research: Bums & Allen Research Institute; Burrill & Company; Burroughs Wellcome Fund; C3: Colorectal Cancer Coalition: California Biomedical Research Association

California Institute of Technology; California Institute for Regenerative Medicine: California Wellness Foundation: Californians for Cures; Campaign for Medical Research; Cancer Research and Prevention Foundation: Canon U.S. Life Sciences, Inc.: Case Western Reserve University School of Dentistry; Case Western Reserve University School of Medicine; Cedars-Sinai School of Medicine; Cedars-Sinai Health System; Center for the Advancement of Health; Central Conference of American Rabbis; CFIDS Association of America; Charles R. Drew University of Medicine and Science: Charles River Laboratories: Child & Adolescent Bipolar Foundation: Children's Memorial Research Center: Children's Neurobiological Solutions Foundation:

(Columbus); Children's Research Institute (Washington).

Children's Tumor Foundation; Childrens Hospital Boston; Christopher Reeve Foundation; City and County of Denver; City of Hope National Medical Center; Cold Spring Harbor Laboratory; Coleman Institute for Cognitive Disabilities, University of Colorado System; Colfax Marathon Partnership, Inc.; Colorado Bioscience Association; Colorado Office of Economic Development and International Trade; Colorado State University; Columbia University; Columbia University College of Dental Medicine; Columbia University Medical Center; Community Partnership; Conference of Boston Hospitals; Teaching Connecticut United for Research Excellence, Inc.;

Conquer Fragile X Foundation; Cornell University; Council for the Advancement of Nursing Science (CANS).

Creighton University School of Medicine; CURE (Citizens United for Research in Epilepsy); Cure Alzheimer's Fund; Cure Paralysis Now; CuresNow; Damon Runvon Cancer Research Foundation: Dana-Farber Cancer Institute; Dartmouth Medical School; David Geffen Medicine School of at UCLA: DENTSPLY International; Digene Corporation; Discovery Partners International; Doheny Eye Institute; Drexel University College of Medicine; Drexel University School of Public Health; Duke University Medical Center; Dystonia Medical Research Foundation; East Tennessee State University James H. Quillen College of Medicine; Eli Lilly and Company; Elizabeth Glaser Pediatric AIDS Foundation.

Emory University; Emory University Nell Hodgson Woodruff School of Nursing; Emory University Rollins School of Public Health; Emory University School of Medicine; FasterCures; FD Hope Foundation; Federation of American Scientists: Federation of American Societies for Experimental Biology (FASEB); Federation of State Medical Boards of the United States, Inc.: Fertile Hope; Fitzsimons Redevelopment Authority; Florida Atlantic University Division of Research; Ford Finance, Inc.; Fox Chase Cancer Center; Fred Hutchinson Cancer Research Center; Friends of Cancer Research, Friends of the National Institute for Dental and Craniofacial Research, Friends of the National Institute of Nursing Research; Friends of the National Library of Medicine; Genetic Al-

Genetics Policy Institute; George Mason University; Georgetown University Medical Center; Guillain Barre Syn-Foundation International; Gynecologic Cancer Foundation; Hadassah; Harvard University; Harvard University School of Dental Medicine; Harvard University School of Public Health; Hauptman-Woodward Medical Research Institute, Inc.; Hereditary Disease Foundation, HHT Foundation International, Inc.; Home Safety Council; Howard University College of Dentistry; Howard University College of Medicine: Huntington's Disease Society of America; IBM Life Sciences Division: Illinois State University Mennonite College of Nursing: ImmunoGen. Inc.; Indiana University School of Dentistry.

Indiana University School of Medicine; Indiana University School of Nursing; Infectious Diseases Society of America; Institute for African American Health, Inc.; Intercultural Cancer Council Caucus; International Foundation for Anticancer Drug Discovery (IFADD); International Longevity Center—USA; International Society for Stem Cell Research; Invitrogen Corporation; Iraq Veterans for Cures; Iris Alliance Fund; Iron Disorders Institute;

tute of Women's Health; Jeffrey Modell Foundation; Johns Hopkins; Johnson & Johnson; Joint Commission on Accreditation of Healthcare Organizations (JCAHO); Joint Steering Committee for Public Policy; Juvenile Diabetes Research Foundation; Keck School of Medicine of the University of Southern California.

Kennedy Krieger Institute; Keystone Symposia on Molecular and Cellular

Biology; KID Foundation; Kidney Cancer Association; La Jolla Institute for Allergy and Immunology; Lance Armstrong Foundation; Lawson Wilkins Pediatric Endocrine Society; Leukemia and Lymphoma Society; Lombardi Comprehensive Cancer Center, Georgetown University; Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center; Louisiana State University Health Sciences Center; Louisiana State University Health Sciences Center School of Dentistry; Lovelace Respiratory Research Institute; Loyola University of Chicago Stritch School of Medicine; Lung Cancer Alliance; Lupus Foundation of America, Inc.; Lupus Foundation of Colorado, Inc.; Lupus Research Institute; Lymphatic Research Foundation; Mailman School of Public Health of Columbia University.

Cancer Support; Malecare Prostate March of Dimes Birth Defects Foundation; Marine Biological Laboratory; Marshalltown [IA] Cancer Resource Center; Masonic Medical Research Laboratory; Massachusetts Biotechnology Council: Massachusetts General Hospital; Massachusetts Institute of Technology; MaxCyte, Inc.; McLaughlin Research Institute; Medical College of Georgia; Medical University of South Carolina; Medical University of South Carolina College of Nursing; MedStar Research Institute (MRI); Meharry Medical College School of Dentistry; Memorial Sloan-Kettering Cancer Center; Memory Pharmaceuticals; Mercer University; Metro Denver Economic Development Corporation; Miami Children's Hospital.

Midwest Nursing Research Society: Morehouse School of Medicine; Mount Sinai Medical Center; Mount Sinai School of Medicine; National Alliance for Eye and Vision Research; National Alliance for Hispanic Health; National Alliance for Research on Schizophrenia and Depression; National Alliance on Mental Illness; National Alopecia Areata Foundation; National Asian Women's Health Organization; National Association for Biomedical Research; National Association of Hepatitis Task Forces; National Caucus of Basic Biomedical Science Chairs; National Coalition for Cancer Research; National Coalition for Cancer Survivorship: National Coalition for Women with Heart Disease: National Committee for Quality Health Care; National Council of Jewish Women: National Council on Spinal Cord Injury; National Down Syndrome Society.

National Electrical Manufacturers Association; National Foundation for Ectodermal Dysplasias; National Health Council; National Hemophilia Foundation; National Hispanic Health Foundation; National Jewish Medical and Research Center: National Marfan Foundation; National Medical Association; National Multiple Sclerosis Society; National Osteoporosis Foundation; National Partnership for Women and Families; National Pharmaceutical Council; National Prostate Cancer Coalition; National Quality Forum; National Spinal Cord Injury Association; National Venture Capital Association; Nebraskans for Research; Nemours; New Jersey Association for Biomedical Research; New Jersey Dental School.

New York Blood Center; New York College of Osteopathic Medicine; New York State Association of County Health Officials; New York Stem Cell

Foundation; New York University College of Dentistry; New York University School of Medicine;

byterian Hospital; North American Brain Tumor Coalition; North Carolina Association for Biomedical Research; Northwest Association for Biomedical Research; Northwestern University; Northwestern University, The Feinberg School of Medicine; Nova Southeastern University College of Dental Medicine; Novartis Pharmaceuticals; Oklahoma Medical Research Foundation; Oral Health America; Oregon Health & Science University; Oregon Health & Science University School of Nursing; Oregon Research Institute; Oxford Bioscience Partners.

Pacific Health Research Institute; Paralyzed Veterans of America; Parent Project Muscular Dystrophy; Parkinson's Action Network; Parkinson's Disease Foundation; Partnership for Prevention: Pennsylvania Society for Biomedical Research; Pharmaceutical Research and Manufacturers of America: Pittsburgh Development Center: Princeton University; Project A.L.S.; Prostate Cancer Foundation: Pseudoxanthoma Elasticum International; Quest for the Cure; RAND Health; Research! America; Resolve: The National Infertility Association: RetireSafe; Rett Syndrome Research Foundation: Rice University.

Robert Packard Center for ALS Research at Johns Hopkins; Rosalind Franklin University of Medicine and Science; Rush University Medical Center; Rutgers University; Salk Institute for Biological Studies: sanofi-aventis; Research Scleroderma Foundation: Secular Coalition for America: Sjogren's Syndrome Foundation, Inc.; Society for Advancement of Violence and Injury Research (SAVIR): Society for Assisted Reproductive Technology: Society for Education in Anesthesia; Society for Male Reproduction and Urology: Society for Neuroscience: Society for Pediatric Research; Society for Reproductive Endocrinology and Infertility; Society for Women's Health Research; Society of Academic Anesthesiology Chairs; Society of General Medicine: Internal Society Gynecologic Oncologists.

Society of Reproductive Surgeons; Society of University Otolaryngologists; South Alabama Medical Science Foundation; South Dakota State Univer-Southern Illinois University School of Medicine; Spina Bifida Association of America: Stanford University; State University of New York at Buffalo School of Dental Medicine; State University of New Downstate Medical Center College of Medicine at Brooklyn; State University of New York Upstate Medical University; Stem Cell Action Network; Stem Cell Research Foundation: Steven and Michele Kirsch Foundation; Stony Brook University, State University of New York; Strategic Health Policy International, Inc.; Student Society for Stem Cell Research; Suicide Prevention Action Network-USA (SPAN); Take Charge! Cure Parkinson's, Inc.; Targacept, Inc.;

Temple University School of Dentistry; Texans for Advancement of Medical Research; Texas A&M University Health Science Center; Texas Medical Center; Texas Tech University Health Sciences Center; The Arc of the United States; The Association for Research in Vision and Ophthalmology; The Biophysical Society; The Brody School of Medicine at East Carolina University; The Burnham Institute; The CJD Foundation; The Critical Path Institute (C-Path); The Endocrine Society; The FAIR Foundation; The Food Allergy and Anaphylaxis Network; The Food Allergy Project, Inc.; The Forsyth Institute; The Foundation Fighting Blindness; The George Washington University Medical Center.

town University Center for the Study of Sex Difference in Health, Aging and Disease.

The Gerontological Society of America; The J. David Gladstone Institutes; The Jackson Laboratory; The Johns Hopkins University Bloomberg School of Public Health; The Johns Hopkins University School of Nursing; The Medical College of Wisconsin; The Medical Foundation, Inc., The Michael J. Fox Foundation for Parkinson's Research; The Ohio State University College of Dentistry; The Ohio State University College of Medicine and Public Health; The Ohio State University School of Public Health; The Parkinson Alliance and Unity Walk; The Research Foundation for Mental Hygiene, Inc.; The Rockefeller University; The Schepens Eye Research Institute; The Scientist; The Scripps Research Institute: The Smith-Kettlewell Eye Research Institute; The Society for Investigative Dermatology; The Spiral Foundation.

The University of Chicago Pritzker School of Medicine; The University of Iowa Carver College of Medicine; The University of Iowa College of Dentistry; The University of Iowa College of Public Health; The University of Mississippi Medical Center; The University of Mississippi Medical Center School of Dentistry; The University of Oklahoma College of Dentistry; The University of Oklahoma Health Sciences Center; The University of Tennessee Health Science Center; The University of Tennessee HSC College of Nursing; The University of Texas Health Science Center at Houston; The University of Texas Health Science Center at San Antonio; The University of Texas M.D. Anderson Cancer Center; The University of Texas Medical Branch at Galveston School of Medicine; The University of Texas Southwestern Medical Center; The University of Toledo Academic Health Science Center; Tourette Syndrome Association: Travis Roy Foundation: Tufts University School of Dental Medicine: Tulane University.

Tulane University Health Sciences Center: Union for Reformed Judaism: Union of Concerned Scientists; Unitarian Universalist Association of Congregations; United Spinal Association; University of Alabama at Birmingham School of Medicine; University of Alabama at Birmingham School of Nursing; University of Alabama at Birmingham School of Public Health; University of Arizona College of Medicine; University of Arkansas for Medical Sciences; University of Buffalo; University of California System; University of California, Berkeley; University of California, Berkeley School of Public Health; University of California, Davis; University of California, Irvine; University of California, Los Angeles; University of California, Los Angeles School of Dentistry; University of California, Los Angeles School of Medicine; University of California, San Diego.

University of California, San Francisco; University of California, San Francisco School of Dentistry; University of California, San Francisco School of Nursing; University of California, Santa Cruz; University of Chicago; University of Cincinnati Medical Center; University of Colorado at Denver and Health Sciences Center; University of Colorado at Denver and HSC School of Dentistry; University of Colorado at Denver and HSC School of Nursing; University of Connecticut School of Medicine; University of Florida; University of Florida College of Dentistry; University of Georgia; University of Illinois; University of Illinois at Chicago: University of Illinois at Chicago College of Dentistry; University of Illinois at Chicago College of Nursing; University of Iowa; University of Kansas; University of Kansas Medical Center.

University of Kansas Medical Center School of Nursing; University of Kentucky; University of Kentucky College of Dentistry; University of Louisville; University of Louisville School of Dentistry; University of Maryland at Baltimore; University of Maryland at Baltimore College of Dental Surgery; University of Maryland at Baltimore School of Nursing; University of Miami; University of Michigan; University of Michigan College of Pharmacy; University of Michigan Medical School: University of Michigan School of Dentistry: University of Michigan School of Nursing; University of Michigan School of Public Health; University of Minnesota; University of Minnesota School of Public Health: University of Missouri at Kansas City School of Dentistry: University of Montana School of Pharmacy and Allied Health Sciences: University of Nebraska Medical Center. University of Nebraska Medical Center College of Dentistry: University of Nevada, Las Vegas School of Dental Medicine; University of Nevada, Reno School of Medicine; University of North Carolina at Chapel Hill; University of North Carolina at Chapel Hill School of Dentistry; University of North Carolina at Chapel Hill School of Public Health: University of North Dakota; University of North Texas Health Science Center; University of Oregon; University of Pennsylvania School of Dental Medicine; University of Pennsylvania School of Medicine: University of Pennsylvania School of Nursing; University of Pittsburgh Graduate School of Public Health; University of Pittsburgh School of Dental Medicine: University of Pittsburgh School of Medicine; University of Rochester Medical Center; University of Rochester School of Medicine and Dentistry; University of Rochester School of Nursing: University of South Carolina Office of Research and Health Sciences; University of South Dakota School of Medicine and Health Sciences.

University of South Florida; University of South Florida College of Nursing; University of Southern California; University of Southern California School of Dentistry; University of Utah HSC School of Medicine; University of Vermont College of Medicine; University of Washington; University of Washington School of Dentistry; University of Washington School of Nursing; University of Washington School of Public Health and Community Medicine; University of Wisconsin-Madison; Van Andel Research Institute; Vanderbilt University and Medical Center;

Vanderbilt University School of Nursing; Virginia Commonwealth University School of Dentistry; Virginia Commonwealth University School of Medicine; Wake Forest University School of Medicine; Washington University in St. Louis; Washington University in St. Louis Center for Health Policy; Washington University in St. Louis School of Medicine.

WE MOVE; Weill Medical College of Cornell University; Whitehead Institute for Biomedical Research; WiCell Research Institution; Wisconsin Alumni Research Foundation; Wisconsin Association for Biomedical Research and Education; Woodruff Health Sciences Center at Emory University; Wright State University; School of Medicine; Yale University; Yale University School of Medicine; Yale University School of Medicine; Yale University School of Nursing.

The PRESIDING OFFICER. The Senator from Georgia.

Mr. CHAMBLISS. Mr. President, I rise today to speak about stem cell research. This is a very delicate and very tough issue and these are difficult decisions that we will all have to make this week.

Some scientists believe that advancement in research requires the creation and development of new embryonic stem cell lines. The truth of the matter is that there are very promising alternatives to embryonic stem cell research, such as stem cells from adult tissue like bone marrow and umbilical cord blood. These cells have repeatedly demonstrated the capability of turning into most tissue types providing the basis for advanced research to find cures for many diseases, including leukemia, Parkinson's disease, juvenile diabetes, sickle cell anemia, heart disease and spinal cord injuries. To date, we have seen promising results coming from the research that has been conducted on these types of cells. Doctors have successfully treated 69 diseases and injuries using adult stem cells such as Lupus, arthritis, liver damage, brain tumors and various forms of cancer. It is vital that we continue to conduct important medical research and continue producing these types of results providing hope for patients and their families.

I am very thankful for the accomplishments that have been made in modern medicine, those of which many of us have already enjoyed or perhaps will in the future.

However, I see the life changing results that have come from adult stem cell research, and can't help but compare these to the lack of results we have seen from embryonic stem cell research which has not provided the concrete benefits to patients that we have seen otherwise. We should not discount the possibilities surrounding the discoveries that lie ahead within medical research, but, since we have seen results from alternative types of stem cell research, not involving embryonic stem cells, should we spend federal money on researching something that has yielded few positive results?

I have seen positive results from the research we have done in the area of

adult stem cell research. In fact, an overwhelming proportion of privately funded research is going towards adult stem cell research.

This is a strong indication of what researchers think regarding the direction of future stem cell research. Adult stem cells and other similar alternatives have helped thousands of patients throughout the world, while the results of embryonic stem cell research have not helped any one patient yet.

I have seen the proven results and lives that have benefited from the research done on adult stem cells. It has been proven that the results of this research have created procedures that have assisted in saving lives, and curing illnesses. Advancements are constantly being made in science, medical research, and technology and so this issue is constantly changing. Just look at how far we have come in the last year on this issue. This debate is not going to be over after this vote, tomorrow but rather the debate is just beginning. However, at this time, I feel that the taxpayer's money should be spent in places where we yield the best results for patients, and currently this is in the area of adult stem cell research.

It is my hope, Mr. President, that we continue to see monumental steps made in medical research, stem cell and otherwise, and that we find cures to diseases such as juvenile diabetes, cancer, sickle cell anemia, and Alzheimer's disease.

I yield the floor.

The PRESIDING OFFICER. The Senator from Kansas is recognized.

Mr. BROWNBACK. Mr. President, I thank my colleague from Georgia for his comments. We are about to wrap up the first full day of debate. We will vote tomorrow on a package of three votes. This is an important debate. This is one area that we have needed to debate for some period of time. We haven't had a real debate on a pending bioethics bill since 1998. The science has changed dramatically since 1998 and the debate at that point in time. We should benefit from this debate and from the science. All of us are interested in people such as Jacki Rabon. I have shown her picture before, but I want to make the point again because several of my colleagues have talked about people with spinal cord injuries. They talk about people with Parkinson's disease and what they wanted to do was cure that—to get something that would work for them. That is what was motivating them. I just want to help this person.

Here is a real live person; traffic accident; paraplegic from the waist down; an active athlete; excited about her future—and that all changed in a few seconds.

We all know this story too well because we have heard it and seen it in our own communities. I simply ask my colleagues: What is the most likely treatment route for her? Is it adult and cord blood stem cells or is it embryonic stem cells? We have to make choices

on dollars and where you invest funds. If we take the \$.5 billion that we have invested in the embryonic stem cells in human and animals over the last 5 years and say we are going to get people such as Jacki walking again, what are we going to invest that money in? Is it going to be on embryonic or adult? She is already showing some improvement and feeling in her hip area. She is able to walk now with braces—through use of adult stem cell therapy which, unfortunately, she has had to go to Portugal to get. Researchers are here. but they cannot get into the FDA trials.

Clearly, the answer, if we want her to walk again during her lifetime, is to work and to fund adult and cord blood stem cells. That is where we are going to get the treatments. That is where it is working.

The other areas may provide some interesting science. But if we are interested in helping people such as Jacki, we have one area that works, and we have another area into which we have put \$.5 billion and it hasn't worked—and we know that.

I want to show you a picture of Dennis Turner. He has been brought up in this debate. I have had him in to testify. He is a Parkinson's patient. We want to cure Parkinson's disease. He was Parkinson's-free for 5 years because of adult stem cell therapy. It started to come back after that period of time, but he got 5 years of his life back.

If our objective is to have a treatment or cure for people such as Dennis Turner, where are we going to put the money? Are we going to put it in embryonic stem cells, where the scientists supporting it say this will take decades to find any sort of treatment, if they ever find a treatment, or put it into the adult stem cell area where they are already showing some results?

I know if I have limited resources, I would want to put my money where it is most likely to yield. It clearly is in the adult and cord blood stem cell area.

A lot of allegations and questions have been made regarding adult stem cells and cord blood and whether they are actually showing the types of results that I have been suggesting.

I ask unanimous consent to have printed in the RECORD at the end of my statement the current list—it gets updated often—of 72 current human clinical applications using adult stem

The PRESIDING OFFICER. Without objection, it is so ordered.

(See exhibit 1.)

Mr. BROWNBACK. Mr. President, next week it will may be 75, but for this week it is 72.

My point in saying highlighting this is that some have said they really question whether we are getting that many treatments. There have only been nine FDA-approved full clinical trials, full treatment areas using adult stem cells. Okay. I will take that. I do not know if that is an accurate num-

ber. But remember that FDA is the standard where you have to go through clinical trials 1 and 2 to get the application and get it tested before it is fully used.

I note that people are challenging how many areas of adult stem cell are being treated. I welcome this debate. I think we should be looking at the science and where it is going. They were saying we really question whether this many areas of adult stem cell treatments are actually happening. They produced an addendum to their challenge on it. They went through all of the 65 areas at that time. It is now 72. But when they did the review, it was 65. The Senator from Iowa was particularly challenging whether we have this many treatment areas. He pulled out one on testicular cancer and said: I don't think they are really getting it there. But this addendum is the people challenging the number of adult stem cell areas that have treatment. On testicular cancer, the researcher described a clinical evaluation showing improved long-term survival of a relapsed testicular cancer patient following the radical therapy that included a transplant of adult stem cells from bone marrow or blood. The research is actually showing that it was an improvement.

I am not saying that these are all FDA-approved areas. This is an area of research. But you actually have a researcher saying it showed improvement. This isn't the group who is challenging whether we are getting these treatments at all. They are not cures today. This is research. But the research shows a promise even in the area that they challenge.

Leukemia—this is from the same addendum. Two clinical studies, each incorporating multiple leukemia types, indicate that adult stem cell transplants from bone marrow or umbilical cord blood improved the survival of children with leukemia.

That is not FDA approved. But it is working. This, after only a short period of time that we have been working with all these different types of adult stem cells. We have known about them in bone marrow for some period of time.

Some patients with Hodgkin's lymphoma show an overall improved survival rate when transplanted with adult stem cells from blood.

The list goes on and on.

I welcome a debate about whether we are getting treatment for areas where people are showing improvement taking place with adult and cord blood because the truth of matter is we are. These are not all FDA approved. We never said that they were. The problem is we need more money to be able to get more of these FDA trials so that we can get more people treated. If we do that, there is a very promising area that is already showing results. Why not put your money there?

Let me give my colleagues a visual of this, if anybody is interested. There is a notebook of showing the accumulation of recent advances in adult stem cell research and other alternatives to cloning and embryonic stem cell research. This is a one-page summary of each of these areas where we are getting treatment. Note that I am not saying cures. I want to be very careful with my words. The treatments are promising in adult and cord blood.

Look how thick this book is. This is just one-page summaries of each of these various areas—cord blood, cartilage, brain damage, cancers. It has been very impressive.

If you do not like this example or if you are still questioning whether we are showing this much progress in adult stem cell, I invite people to go on the Internet and look at a site called ClinicalTrials.gov. This is an area where clinical trials are listed on the Internet. I didn't know about it until today. It sounded very interesting to me. It shows, as of now—I guess these numbers are actually growing with 565 such clinical trials currently active or recruiting patients using adult or cord blood stem cells to treat people.

If we want to cure people, if we want to find real treatments, if we want to see cures for people with spinal cord injuries, Parkinson's, diabetes, cancer or heart disease, the clear area to invest in is adult and cord blood. That is the clear area to go into.

Let us look on the other side of the aisle on this the embryonic stem cell work which is being pushed here today.

By the way, my colleagues have known about this for a very long time. We have known about embryonic stem cells for 25 years. We have worked and looked at these things for a long period of time.

They say this is arbitrary and it is not going to support killing embryos. What is being talked about is using taxpayer money to expand the lines of embryonic stem cell research. To get embryonic stem cells, you have to destroy an embryo.

The President set a date, August 9 at 9 p.m, when he was delivering a speech to the Nation saying, after this point in time, we are not going to fund it any further because we do not want to fund the additional destruction of human life. We will work on it on a prior date. That is why that date was picked.

Here is a clear demarcation. We will fund it prior; we have to the tune of half a billion on human and animal. It is both. After that, we will not fund it on humans because the life-and-death decision has already been made on these designs prior to August 9 but not on future ones.

Now, if we say we are going to use taxpayer money to fund any human embryonic stem cell research, people could go out today after we fund this, destroy human embryos, develop the lines, and have Federal taxpayer dollars. I again point out to my colleagues, there are no prohibitions in the United States today against any embryonic stem cell research. You can do it anywhere you want. We do have a

limitation on the Federal taxpayer dollars, on where they can go in the future destruction of human life.

Now, with this half a billion that we have invested over the last 5 years, how many human treatments do we have from embryonic stem cells? I have a notebook that shows the number of human treatments. I will show this notebook again. This is adult and cord blood. Here are human treatments on embryonic stem cell research. We do not have the research. It is not there. They do not exist.

It is interesting research. It has proven very problematic to get to people.

A number of my colleagues have been pushing this bill for some period of time, and I do not question or challenge what they were doing. I think they want to find cures. But the problem is we have not found treatments in the embryonic field.

They were saying in the year 1999 one of my colleague's medical experts testified that it may well be within 5 years of a cure for Parkinson's disease, Alzheimer's, and a long list of other human ailments. Stem cell research has enormous potential.

That is true. But it is adult cord blood stem cell research that is working. It is not embryonic. The embryonic has not produced the treatments. That was 1999. We are 7 years later, and it has not produced a peer-reviewed treatment.

We have scientists who testified at a hearing in 1998. Mr. President, I refer my colleagues to www.access.gpo.gov/ congress/senate for that testimony.

Mr. President, when Dr. Gearhart was asked how long will it be before we get these cures to Parkinson's, Alzheimer's, or cancer, he responded:

I actually think within several years, to be honest with you . .

That was 1998. Eight years later, here we are. Dr. Gearhart—one of the leading researchers in this field.

Then Dr. Thompson, one of the leading researchers on Parkinson's:

I am going to say 5 to 10 years more. It will be one of the first ones.

We do have a treatment being developed. And it is adult stem cells for Parkinson's. We do not need to make this life-and-death decision and expand taxpayer funding for the embryonic lines.

My point is, in 1998 the leading researchers were saying we will have these cures in a few years, 5 to 10 years, and now researchers are saying it is decades, if even in their lifetime, that it will happen.

I conclude with this point. If this were all in the abstract and we were saying that we will spend another half a billion in this area, go ahead and do that, you could say: Well, all right, we spend a lot of money around here, we will do that. The problem with it is: how many millions of dollars will be spent on research, which is based on destroying human embryos that become human people? This is the beginnings of human life. That is the real ethical rub on top of the financial rub

of whether this is the right place to invest.

I have cited the snowflake child, Hannah previously. Was she just a clump of stem cells? Early life can be very fragile.

This is Isaiah Royal, born to one of my staff members. Isaiah Royal was born at 24 weeks of age, very early. He is a fighter. But I don't think you can possibly say he is not human life. He is just 23 weeks after the embryonic stage that we are talking about, 23 weeks and a couple of days after that. Would you deny that he is human life? You would say no, of course not. Isaiah is struggling. He weighed 1 pound 14 ounces at birth. He is a good, tough, fighter. But we are talking about fragile human life, and it should be treated as sacred. We should not do research on it. Human life is important.

This is an important question. I urge my colleagues to vote against H.R. 810.

#### EXHIBIT I

72 CURRENT HUMAN CLINICAL APPLICATIONS USING ADULT STEM CELLS

ANEMIAS & OTHER BLOOD CONDITIONS

Sickle cell anemia.

Sideroblastic anemia.

Aplastic anemia

Red cell aplasia (failure of red blood cell development).

Amegakarvocytic thrombocytopenia.

Thalassemia (genetic [inherited] disorders all of which involve underproduction of hemoglobin).

Primary amyloidosis (A disorder of plasma cells).

Diamond blackfan anemia.

Fanconi's anemia.

Chronic Epstein-Barr infection (similar to Mono).

### AUTO-IMMUNE DISEASES

Systemic lupus (auto-immune condition that can affect skin, heart, lungs, kidneys, joints, and nervous system).

Sjogren's syndrome (autoimmune disease w/symptoms similar to arthritis).

neuro-Myasthenia (An autoimmune muscular disorder).

Autoimmune cytopenia.

Scleromyxedema (skin condition).

Scleroderma (skin disorder).

Crohn's disease (chronic inflammatory disease of the intestines).

Behcet's disease.

Rheumatoid arthritis.

Juvenile arthritis.

Multiple sclerosis.

Polychondritis (chronic disorder of the cartilage).

Systemic vasculitis (inflammation of the blood vessels).

Alopecia universalis.

Buerger's disease (limb vessel constriction, inflammation).

## BLADDER DISEASE

# End-stage bladder disease.

tumors-medulloblastoma

Retinoblastoma (cancer).

Ovarian cancer.

Skin cancer: Merkel cell carcinoma.

Testicular cancer.

Lymphoma.

Non-Hodgkin's lymphoma.

Hodgkin's lymphoma.

Acute lymphoblastic leukemia.

Acute myelogenous leukemia.

Chronic myelogenous leukemia.

Chronic myelomonocytic leukemia.

Juvenile myelomonocytic leukemia.

Cancer of the lymph nodes: Angioimmunoblastic lymphadenopathy.

Multiple myeloma (cancer affecting white blood cells of the immune system).

Myelodysplasia (bone marrow disorder).

Breast cancer.

Neuroblastoma (childhood cancer of the nervous system).

Renal cell carcinoma (cancer of the kid-

Soft tissue sarcoma (malignant tumor that begins in the muscle, fat, fibrous tissue, blood vessels)

Ewing's sarcoma.

Various solid tumors.

Waldenstrom's macroglobulinemia (type of lymphoma).

Hemophagocytic lymphohisticcytosis

POEMS syndrome (osteosclerotic myeloma)

Myelofibrosis.

#### CARDIOVASCULAR

Acute Heart damage.

Chronic coronary artery disease.

#### IMMUNODEFICIENCIES

Severe combined immunodeficiency syndrome

X-linked lymphoproliferative syndrome.

X-linked hyper immunoglobulin M syndrome.

#### LIVER DISEASE

Chronic liver failure.

Liver cirrhosis.

NEURAL DEGENERATIVE DISEASES & INJURIES

Parkinson's disease.

Spinal cord injury.

Stroke damage.

OCIILAR.

Corneal regeneration.

WOUNDS & INJURIES

Limb gangrene.

Surface wound healing. Jawbone replacement.

Skull bone repair.

OTHER METABOLIC DISORDERS

Hurler's syndrome (hereditary genetic dis-

Osteogenesis imperfecta (bone/cartilage disorder).

Krabbe Leukodystrophy (hereditary genetic disorder).

Osteopetrosis (genetic bone disorder).

Cerebral X-linked adrenoleukodystrophy.

Mr. BROWNBACK. I yield to my colleague from Virginia who is here to speak on some important topics.

The PRESIDING OFFICER. The Senator from Virginia.

Mr. WARNER. Mr. President, I thank my distinguished colleague. We have another distinguished colleague here. It is my understanding that at 8 o'clock, the time of the distinguished Senator from Kansas now shifts to the other side of the aisle, but my colleague said he only wants 3 or 4 minutes.

Mr. BROWNBACK. I have other things I can cover. I understand the distinguished Senator from Virginia wanted to come over and speak on a very pressing matter of foreign policy. That is why I yielded the time to my colleague.

Mr. WARNER. I will try to compress my time in 10 minutes.

Mr. BROWNBACK. Good.

If I could, what does the Senator from Iowa desire?

Mr. HARKIN. If the Senator would yield, I understand the Senator from Virginia wanted 10 minutes. I said I didn't intend to speak for half an hour; I just wanted to speak for about 5 minutes at 8 o'clock and yield back the remainder of my time and he could speak as long as he wanted to at that time. It is only 15 minutes from now. I thought the Senator from Kansas was probably going to use up most of the time.

Mr. BROWNBACK. I was. But I understood that my colleague wanted to speak on this particular issue. If the Senator wants to summarize and my colleague from Virginia wants to wait, I was offering him that courtesy because he had discussed coming over here early to do that.

Mr. WARNER. I am here to accommodate all.

Would the Senator like to finish his remarks?

Mr. HARKIN. I say to the Senator from Virginia, go ahead and take your time. I will speak later. That is fine.

(The remarks of Mr. WARNER are printed in today's RECORD under "Morning Business.")

Ms. COLLINS. Mr. President, as a long-time supporter of stem cell research, I want to commend the majority leader for working out an agreement that will give the Senate the opportunity to act on this critically important issue.

I am particularly pleased that the Senate will finally have the opportunity to vote on the Stem Cell Research Enhancement Act. I am proud to be a cosponsor of this bipartisan bill which will expand the number of stem cell lines that are eligible for federally funded research, enabling scientists to take full advantage of the scientific and medical opportunities provided by stem cells. At the same time, it establishes standards and creates a framework to ensure that this research is conducted ethically.

The promise of embryonic Stem cell lines lies with their potential to develop into virtually any cell, tissue, or organ in the body. As a consequence, this research holds considerable potential to treat and even cure a vast array of diseases and conditions. Researchers could, for example, potentially generate insulin-producing islet cells for patients with juvenile diabetes; neurons to treat Parkinson's disease, ALS, and Alzheimer's disease; as well as bone marrow cells to treat cancer. It is estimated that more than 100 million Americans are currently afflicted by diseases or disabilities that have the potential to be treated through this research.

On August 9, 2001, President Bush announced that Federal funds could, for the first time, be used to support research on embryonic stem cells. This research, however, was limited to existing embryonic stem cell lines created prior to 9 p.m. on that day.

In the 4 years since the President made that announcement, this stem cell policy has fallen far short of its original goals. While the Human Embryonic Stem Cell Registry at the NIH lists 78 stem cell lines, at best, no more than 212 lines will ever be available for research under the current policy.

Moreover, as Dr. John Gearhart of Johns Hopkins University told the Special Committee on Aging last year, existing lines are "contaminated with animal cells, lack genetic diversity, are not disease-specific and are not adequate for researchers to apply to a wide variety of diseases." Limiting researchers to these lines therefore places huge and unnecessary roadblocks in the way of possible treatments and cures for devastating diseases like Alzheimer's disease, ALS, cancer and diabetes.

We have learned a lot about stem cells since 2001. For example, scientists have now crated methods for growing stem cell lines that are free of animal cells, greatly improving their potential for treating and curing disease. They have also created "disease specific" stem cell lines. Under the current policy, however, these "new and improved" stem cell lines are not available to federally funded researchers in the United States.

It is therefore time for us to update our stem cell policy to reflect what we have learned so that we can accelerate this important research, which hold such promise for millions of Americans and their families.

The Stem Cell Research Enhancement Act lifts the current restriction so that stem cell lines are eligible for federally funded research regardless of the date on which they were created. Federal funding, however, would continue to be restricted to stem cells derived from embryos originally created for fertility treatments that are in excess of the clinical need and that otherwise would be discarded.

The legislation also requires the informed consent of the donors and prohibits any financial inducement to donate. Finally, the bill calls on the National Institutes of Health to develop strict guidelines to ensure that researchers adhere to clear ethical and moral standards.

As the founder and co-chair of the Senate Diabetes Caucus, I am particularly excited about the promise that stem cell research holds for a cure for diabetes. Early research has shown that stem cells have the potential to develop into insulin-producing cells to replace those that have been destroyed in people with type I diabetes.

Last year, I chaired a hearing in conjunction with the Juvenile Diabetes Research Foundation's Children's Congress to examine the devastating impact that juvenile diabetes has had on American children and their families. We heard heartbreaking testimony from children who had traveled to Washington to tell Congress what it is like to have diabetes, just how serious it is, and how important it is that we fund the research necessary to find a

Steffi Rothweiler from Falmouth, ME, told the committee that she actually couldn't remember having a normal life without nights and weekends, and every hour of every day to take care of diabetes. She told us about her parents, who have given up their nights and weekends, and every hour of every day to take care of her and make sure that she stays in tight control of her blood sugar levels so that she can stay as healthy as possible. Steffi asked that we do all that we can to find a cure for diabetes as quickly as possible. We simply cannot ignore the potential that embryonic stem cell research holds for wonderful young people like Steffi.

I am sensitive to the ethical concerns raised by opponents of this research. That is why I have cosponsored the legislation introduced by Senators SANTORUM and SPECTER to encourage the development of alternative methods for deriving stem cells without using embryos.

The fact is, however, that the embryos that will be used for this research would otherwise be discarded. In my view, the ethical choice is to use them for research that may benefit millions of Americans rather than discard them as medical waste.

Moreover, what is often ignored in this debate is that embryonic stem cell research is occurring in the private sector, where it is outside the purview of the NIH. It therefore lacks the scientific and ethical oversight that routinely occurs with federally funded research. Dr. Allen Spiegel, who was then the Director of the National Institute of Diabetes anti Digestive and Kidney Diseases, testified at our Children's Congress hearing last year. He told the committee that, while NIH routinely works very closely with the private sector, in the area of stem cell research, "there is a wall." By expanding our current stem cell policy, we are tearing down that wall, allowing more research but with clear ethical standards.

Opponents of embryonic stem cell research contend that adult stem cells derived from tissue, such as bone marrow, are a sufficient replacement for embryonic stem cells in forwarding this important research. I believe that we need both. But, as Dr. Speigel told our committee, with regard to diabetes research:

We need to do embryonic stem cell first because it can give us a better understanding of what causes Type I diabetes . . . because it will actually inform our ability to work with adult stem cells . . . and finally, because, and one cannot guarantee or promise this, the embryonic stem cells themselves, if successfully turned into insulin-secreting beta cells, could be the source of cell therapy.

Mr. President, I believe that it would be tragic not to take advantage of this opportunity to accelerate research that can potentially help millions of people. I therefore urge my colleagues to join me in voting for the Stem Cell Research Enhancement Act.

The PRESIDING OFFICER. The Senator from Iowa.

Mr. HARKIN. Mr. President, I will not take the entire 25 minutes that are left, but I did want to close out a little bit today before we proceed into tomorrow by just responding to a few of the things that were said today to try to clear up a couple of issues.

The Senator from Kansas, my good friend, was going on and on about stem cells, as he has most of the day, and about how all these treatments and everything are out there. I could respond to every one of them, but I think what we have to keep in mind is that if all of these diseases that the Senator from Kansas talked about have been treated with adult stem cells, how come all of the patient advocacy groups for these diseases support H.R. 810?

One has to wonder, when you listen to the Senator from Kansas outline all these diseases that are being helped by adult stem cells. He brings up the picture of the guy who had Parkinson's. He was helped with adult stem cells. But, again, he has now gone back and he is where he was before.

Well, if adult stem cells are doing so much, why is the Parkinson's group, the Parkinson's Action Network, supporting H.R. 810? Why are all these advocacy groups supporting H.R. 810 if adult stem cells are so great? Are they just a bunch of stupid people out there? Have they been hoodwinked and misguided?

These advocacy groups know. They know what is going on. And they know that S. 2754 is no substitute for H.R. 810. While adult stem cells are fine, as I pointed out earlier, they have been investigating and doing science on adult stem cells for over 30 years.

Now, just another little thing that happened: The Senator from Kansas, I heard him say: Well, they have been investigating animal stem cells for 20 years

That might lead you to think: Well, we have been looking at stem cells for 20 years. Not so. We never derived human embryonic stem cells until 1998—8 years ago. So I wanted to make the record clear on that.

Now, the Senator also mentioned something about testicular cancer. He made all kinds of claims about adult stem cells helping testicular cancer. Let me read from a letter written by Craig Nichols, MD, a member of the board of the Lance Armstrong Foundation. We all know the Lance Armstrong Foundation is basically focused on testicular cancer because that is what Lance Armstrong had. And he licked it. But let me quote from the letter written on July 14:

Dear Senator Frist:

As a member of the Lance Armstrong Foundation's Board of Directors, I am writing in response to assertions that adult stem cells have treated or cured the disease of testicular cancer. . . . I feel that it is important to set the record straight on this issue.

Testicular cancer is the most common cancer among men ages 15–35 and approximately 8,000 men will be diagnosed with testicular

cancer in the United States this year. While testicular cancer is one of the most curable forms of cancer, our organization would like to emphasize as the Senate debates H.R. 810 . . . that we have NOT completely eradicated the disease.

There is not an FDA-approved adult stem cell treatment generally available to treat testicular cancer.

The Senator from Kansas kind of, in his comments, led us to think that there might be. Here is what Dr. Nichols said:

Rather, adult stem cells enable testicular cancer patients to withstand a higher dose of chemotherapy during treatment for the disease.

The adult stem cells enable patients to withstand a higher dose of chemotherapy. Dr. Nichols says:

We support exploring every avenue of research, including embryonic stem cell research within specified ethical limits, until a cure is found. . . .

The Lance Armstrong Foundation asks that you and your colleagues pass H.R. 810, and not accept any substitutes.

I ask unanimous consent that this letter from the Lance Armstrong Foundation be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

Lance Armstrong Foundation,  $Austin, \ TX, \ July \ 14, \ 2006.$ 

Hon. WILLIAM FRIST, Majority Leader, U.S. Senate,

Washington, DC.
DEAR SENATOR FRIST: As a member of the Lance Armstrong Foundation's (LAF) Board of Directors, I am writing in response to assertions that adult stem cells have treated or cured the disease of testicular cancer. While the mission of the LAF is to inspire and empower people affected by ALL types of cancer, I feel that it is important to set the record straight on this issue.

Testicular cancer is the most common cancer among men ages 15–35 and approximately 8,000 men will be diagnosed with testicular cancer in the United States this year. While testicular cancer is one of the most curable forms of cancer, our organization would like to emphasize as the Senate debates H.R. 810, the Stem Cell Research and Enhancement Act, that we have NOT completely eradicated the disease.

There is not an FDA-approved adult stem cell treatment generally available to treat testicular cancer. Rather, adult stem cells enable testicular cancer patients to withstand a higher dose of chemotherapy during treatment for the disease.

We support exploring every avenue of research, including embryonic stem cell research within specified ethical limits, until a cure is found. The most respected scientists in our field view embryonic stem cells as an area of research that must be explored, and one that our government must make a commitment to support. The Lance Armstrong Foundation asks that you and your colleagues pass H.R. 810, and not accept any substitutes.

Sincerely.

CRAIG NICHOLS, M.D.,

Member of the Board,

Lance Armstrong Foundation.

Mr. HARKIN. Now, we hear claims that leukemia and lymphomas have been cured or treated by adult stem cells. Here is what George Dahlman of the Leukemia and Lymphoma Society has to say about that:

On behalf of the Leukemia and Lymphoma Society, I am writing in response to assertions that adult stem cells have treated or cured several blood cancers, including several leukemias, lymphomas and multiple myeloma.

As a representative of more than 700,000 patients and their caregivers in this country that battle blood cancers on a daily basis, our organization would like to emphasize, as the Senate debates H.R. 810 . . . that we exist today because we have not found cures for these devastating diseases. . . the claim that treatment of blood cancers with cord blood, blood or marrow stem cells—known as hematopoietic stem cells—demonstrates a potential of "adult stem cell" research or is a substitute of embryonic stem cell research is misleading and disingenuous.

Again, this says that the claim that treatment of blood cancer with marrow stem cells demonstrates that adult stem cells is a substitute is misleading and disingenuous.

Mr. Dahlman concludes:

The Leukemia and Lymphoma Society asks that you and your colleagues pass H.R. 810, and not accept any substitutes.

Mr. President, we have heard a lot of talk about these embryos and that we all started as a dot. I have often used this example. I have said: What is an embryo? I have often put a dot on a piece of paper and held it up for audiences to see and said that is what we are talking about. It is that big, the size of a period at the end of a sentence. That is not to diminish the importance of an embryo. But I use it in comparison. An embryo at the blastocyst stage has between 100 and 200 cells. That embryo we are talking about that is in an in vitro fertilization clinic and frozen in liquid nitrogen will never become a human being unless and until it is implanted into a uterus and it takes hold and develops. Sometimes they are implanted and they don't take hold and they are discharged. So an embryo is potential life—potential in that if it is implanted and takes hold, it could become a human being. It is potential life.

Look at this photo of Lauren Stanford. She says:

I am so happy to hear that the Senate is thinking of passing H.R. 810. I can dream again—dream of that great day when I write a thank you letter to the Senate, the House, and everyone who helped me become just another girl; a girl who dreamed and hoped and one day got just what she wanted; her health and future.

Lauren Stanford has diabetes. She knows what will happen if she is not cured. At some point in her life, she will probably become blind. At some point in her life, she will probably lose a foot, a leg, one or more of her limbs. At some point in her life, diabetes will take her. Lauren Stanford. I don't know her. I don't know that I ever met Lauren Stanford. This is not potential life; this is real life. This is a human being who is living right now.

That dot on the paper is an embryo. Is it alive? Of course it is alive. Is it a human being? No. It is potential life. Lauren Stanford is real life.

Read the bill. Read H.R. 810. Ethical guidelines. We can only use those embryos that are left over from in vitro

fertilization that are going to be discarded. Read the bill:

Prior to the consideration of embryo donation and through consultation with the individuals seeking fertility treatment, it was determined that the embryos would never be implanted in a woman and would otherwise be discarded.

#### Written consent.

The individuals seeking fertility treatment donated the embryos with written informed consent and without receiving any financial or other inducements to make the donation.

It has to be determined, before any embryo could ever be used for stem cell derivation, that the embryos would never be implanted in a woman and would otherwise be discarded. Every day, fertility clinics discard unwanted embryos. People have IVF—50,000 babies were born last year to couples who wanted to have a baby and could not and needed IVF. But some embryos were left over. Well, couples who have had their children then call up the clinic or the clinic calls them and the clinic says: Do you want to continue to pay for us to keep these embryos frozen?

If you have had your children and you don't want to expand your family, you say: No, I don't want to pay for that anymore. Guess what. The IVF clinic discards it. I have heard they basically throw them in the sink and wash them down the sink. They are only as big as a period at the end of a sentence.

So the real question for us really comes down to that, unless we want to outlaw in vitro fertilization and make it a crime, which I don't hear anybody here wanting to do. As long as we have in vitro fertilization and have leftover embryos, the real question for us is this: If the donors of those embryos, through written informed consent, determine it will never be implanted in a woman and will be discarded, is it better to have them discarded and flushed down the drain or used for the kind of scientific research that will cure Lauren Stanford of her diabetes? Potential life versus real life. Potential life that will be discarded versus real life. Potential life that will be flushed down the drain versus Lauren Stanford, real life. That is the question for

We hear all of these arguments around here about we were all an embryo at one time. Of course we were. The question is, What happens to all those embryos? Right now, they are being discarded, and it is perfectly legal to do so. I don't see anyone here with legislation saying it is going to be a crime for them to be discarded, a crime to have in vitro fertilization. Really, that is the choice. Do we discard potential life or do we use it to save real life? This is not potential life, this is real.

My nephew Kelly, who suffered a tragic accident on an aircraft carrier 27 years ago, hasn't walked since. He keeps hope alive that one day he will walk again. He knows about the research that has been done on rats and

mice where spinal cords have been reconnected using embryonic stem cells. He knows that. I have never heard him say it, but I suppose he would probably echo what Christopher Reeve once said: Oh, to be a rat.

He knows that. That is real life. Kelly is a real person. He is alive. He is not potential life. That is our decision when we face the vote tomorrow on H.R. 810.

So all these other arguments about adult stem cells and this kind of stuff, fine, I have nothing against adult stem cell research. I am in favor of it. We ought to keep it going. But to choke off-not what I say but what the leading scientists say, the leading Nobel Prize winners say, what all of these disease groups who have medical people sitting on their boards, what they all say is the most promising avenue of research for curing Alzheimer's, juvenile diabetes, spinal cord injuries, Parkinson's, and ALS, the most promising is not adult stem cells. It is embryonic stem cells. That is what they say, not

To cut that off and to say, no, we won't do it is telling Lauren Stanford that potential life, that an embryo the size of a pencil dot, yes, is life; it is human potential that is as important as she is; that they have equal weight on the scales. I am sorry, Mr. President, I don't think so, not when it is going to be discarded, legally thrown down the drain. And as long as we have strict ethical guidelines in the bill—strict ethical guidelines, more than exists right now, stronger ethical guidelines than are in the law right now.

To me, there is really only one answer. We should be in favor of this real life of curing diseases, seeking treatments and cures in an ethical manner, which is what this bill does. So I hope that tomorrow we have an overwhelming vote in favor of H.R. 810.

I understand today the administration came out with a Statement of Administration Policy, or SAP as it is called around here, saying the President would veto it. I hope the President rethinks this. He is overseas anyway. Let's face it, we are all kind of captives of our staff around here. Staff tells us this and that. OMB says this, OMB says that. I am hopeful this is the work of some staff, that the President hasn't thought about it. He has been overseas focused on the G8; now, I am sure, focused on the Middle East.

I hope when President Bush thinks about it that he remembers Lauren Stanford, that he will remember the letter from Nancy Reagan and he will come down on the side of real life, and he will come down on the side of an ethical approach to embryonic stem cell research.

I still believe in miracles, and I hope a miracle will occur and the President of the United States finds it in his heart to say that what he did on August 9, 2001, was done with a lack of adequate knowledge. He can say: Look, we thought there were 78 lines, and

there were not; there were only 21 lines. We didn't know they were all contaminated with mouse feeder cells. They can't be used for human therapies. That he will say in light of all that we know now, and with the strict ethical guidelines we have in this bill, I see fit to sign into law H.R. 810.

That is my hope. That is the hope of Lauren Stanford. That is the hope of the millions of Americans out there who suffer from Alzheimer's, the millions who suffer from spinal cord injuries and their families and caregivers and Parkinson's and ALS, and so many more.

Tonight they are praying—they are praying—that a miracle occurs and that the President will change his mind and sign this bill. And until the very moment that he vetoes it, I will remain hopeful that miracle will occur.

Mr. President, I yield the floor and suggest the absence of a quorum.

The PRESIDING OFFICER. The clerk will call the roll.

The assistant legislative clerk proceeded to call the roll.

Mr. FRIST. Mr. President, I ask unanimous consent the order for the quorum call be rescinded.

The PRESIDING OFFICER. Without objection, so ordered.

#### MORNING BUSINESS

Mr. FRIST. I ask unanimous consent there now be a period for morning business with Senators permitted to speak for up to 10 minutes each.

The PRESIDING OFFICER. Without objection, it is so ordered.

# THE GREAT COMPROMISE; AN AMERICAN MOMENT

Mr. BYRD. Mr. President, yesterday, July 16, was the anniversary of one of the greatest events in American history. It was 219 years ago that our Founding Fathers were meeting at the Constitutional Convention in Philadelphia, attempting to formulate a workable plan of Government. At the time, the young American Government was operating under the Articles of Confederation, which every day was proving to be unworkable.

For 7 weeks, the Constitutional Convention had been working to devise a better form of Government, a "more perfect union." It would be a Government with three branches: an executive branch, a legislative branch, and a judicial branch. The branches of the Government would have separated powers and the ability to check and balance one another.

The Convention delegates had already made a number of important decisions about the structure of the Congress. The Convention had set the minimum age for Members of the Senate at 30 and a term length at 6 years, as opposed to 25 years of age for Members of the House of Representatives, who would have 2-year terms.

But then came the stumbling block, how the States would be represented in